

Campaign/New Instrument Name [1]	Status	Primary Agency (Operating and/or Funding)	Partnering Agencies	URL	Description	Primary Observing Type	Secondary Observing Type	Study Area	Year Start	Month Start	Day Start	Year End	Month End	Day End	Contact	Long-Term Timeseries
ABoVE (Arctic-Boreal Vulnerability Experiment)	In Progress	NASA		http://above.nasa.gov/	Field experiment and 2017 airborne campaign in Alaska and NW Canada to better understand the vulnerability and resilience of boreal and Arctic ecosystems to environmental change and the impacts on ecosystem services.	Field campaign	Airborne campaign	Arctic	2015	1	1	Ongoing	Ongoing	Ongoing	Scott Goetz (Northern Arizona University)	No
ACCLIP (Asian summer monsoon Chemical and Climate Impact Project)	Delayed	NSF	NASA	https://www.esl.ucar.edu/field_projects/acclip	The goal of ACCLIP is to measure the unique chemical composition, water vapor, and aerosol content in air processed in the ASM anticyclone from a base in the western Pacific in order to evaluate its global impact on atmospheric chemistry and radiation. The ASM anticyclone has been shown to contain an enhanced aerosol layer at the upper troposphere - lower stratosphere (UTLS) level - the Asian Tropopause Aerosol Layer (ATAL). The coupling of the ATAL to the UTLS dynamical system through deep monsoon convection in the NH summer season has the potential to generate significant chemical and climate impacts. Potentially large black carbon (BC) enhancements in the ATAL also may affect dynamic processes in the region by generating in situ heating, potentially reducing precipitation.	Airborne campaign		South Korea	2021							No
ACE-ENA (Aerosol and Cloud Experiment in the Eastern North Atlantic)	Completed	DOE		https://www.arm.gov/research/campaigns/ae2017ace-enat https://text-the%20aerosols%20and%20cloud%20experiments.and%20aerosols%20over%20the%20Azores	The Eastern North Atlantic (ENA) is a region of persistent but diverse subtropical marine boundary layer (MBL) clouds, whose albedo and precipitation are highly susceptible to perturbations in aerosol properties. Boundary layer aerosol in the ENA region is influenced by a variety of sources, leading to strong variations in cloud condensation nuclei (CCN) concentration and aerosol optical properties. The Aerosol and Cloud Experiments in the Eastern North Atlantic (ACE-ENA) project is motivated by the need for comprehensive in-situ characterizations of boundary layer structure, and associated vertical distributions and horizontal variabilities of low clouds and aerosol over the Azores. The ARM Aerial Facility (AAF) Gulfstream-1 (G-1) aircraft was deployed at the long-term ARM ENA site on Graciosa Island, Azores during two intensive measurement periods (IPs) of early summer (June to July) of 2017 and winter (January to February) of 2018, respectively. Deployments during both seasons allow for examination of key aerosol and cloud processes under a variety of representative meteorological and cloud conditions. The science themes for the proposed deployments include: (1) Budget of MBL CCN and its seasonal variation; (2) Effects of aerosol on cloud and precipitation; (3) Cloud microphysical and macrophysical structures, and entrainment mixing; (4) Advancing retrievals of turbulence, cloud, and drizzle; and (5) Model evaluation and processes studies.	Field campaign		Azores	2017	6	NA	2018	2	NA	Sally McFarlane, DOE	No
ACT-America (Atmospheric Carbon and Transport – America)	Completed	NASA	NOAA	http://act-america.larc.nasa.gov/	Earth Venture Suborbital campaign comprised of five airborne campaigns across three regions in the eastern United States to study the transport and fluxes of atmospheric carbon dioxide and methane.	Field campaign	airborne campaign	3 sites in eastern United States	2015	2	1	2020	1	31	Ken Davis (Penn State)	No
ACTIVATE (Aerosol Cloud meteorology Interactions over the western Atlantic Experiment)	In Progress	NASA		https://activate.larc.nasa.gov/	ACTIVATE is a NASA Earth Venture Suborbital campaign that will provide important globally-relevant data about changes in marine boundary layer cloud systems, atmospheric aerosols, and multiple feedbacks that warm or cool the climate.	Field campaign	airborne campaign	Western North Atlantic	2019	1	28	2024	1	27	Armin Soroshian (University of Arizona)	No
AeroMarine	Completed	NOAA		http://www.esrl.noaa.gov/csd/projects/aeromarine/		Field campaign		Reunion Island	2016	3	NA	2016	3	NA		No
AERONET (Aerosol Robotic Network)	Ongoing	NASA	CNES	https://aeronet.gsfc.nasa.gov/	The AERONET (Aerosol Robotic Network) project is a federation of ground-based remote sensing aerosol networks established by NASA and PHOTONS (PHOTOmérique pour le Traitement Opérationnel de Normalisation Satellitaire; Univ. of Lille 1, CNES, and CNRS-INSU) and is greatly expanded by networks (e.g., RIMA, AeroSpan, AEROCAN, and CARsNET) and collaborators from national agencies, institutes, universities, individual scientists, and partners. For more than 25 years, the project has provided long-term, continuous and readily accessible public domain database of aerosol optical, microphysical and radiative properties for aerosol research and characterization, validation of satellite retrievals, and synergism with other databases. The network imposes standardization of instruments, calibration, processing and distribution.	Ground network		Global	1990			Ongoing	Ongoing	Ongoing	Brent Holben (NASA)	No
AfriSAR	Completed	NASA	ESA	http://www.nasa.gov/feature/goddard/2016/nasa-partner-space-agencies-measure-forests-in-gabon/ https://agage.mit.edu/	Joint ESA-NASA airborne campaign to advance capabilities of using radar and lidar to estimate biomass of humid tropical ecosystems.	Spaceborne		Gabon	2015	7	1	NA	NA	NA	Barry Lefer, Hank Margolis	No
AGAGE (Advanced Global Atmospheric Gases Experiment)	Ongoing	NASA	NOAA, Bureau of Meteorology Australia, CMA, CSIRO, DECC, FOEN, Norwegian Environment Agency	https://agage.mit.edu/	AGAGE is part of the powerful global observing system that is measuring halocarbons, including bromocarbons, in the Earth's atmosphere. The original ALE/AGAGE/AGAGE stations (Mace Head, Trinidad Head, Ragged Point, Cape Matulla, and Cape Grim) occupy coastal sites around the world chosen to provide accurate measurements of trace gases whose lifetimes are long compared to global atmospheric circulation times. Two stations in Europe (Zeppelin, Jungfraujoch) and two in East Asia (Shangdianzi and Gosan) have joined the AGAGE network in recent years by using the same instrument and calibration scales.	Ground network		Global	1978			Ongoing	Ongoing	Ongoing	Ronald G. Prinn (MIT)	No
AirMOSS (Airborne Microwave Observatory of Subcanopy and Subsurface)	Completed	NASA		https://airmoss.jpl.nasa.gov/	Airborne P-band radar flights to develop algorithms for estimating soil properties.	Field campaign		CONUS	2012	NA	NA	2015	NA	NA	Mahta Moghaddam (USC)	No
AIRS (Atmospheric Infrared Sounder) on the Aqua Satellite	Ongoing	NASA		https://aqua.nasa.gov/content/airs	Launched into Earth-orbit on May 4, 2002 aboard NASA's Aqua satellite, the Atmospheric Infrared Sounder, AIRS, provides data critical to the monitoring of Earth's atmosphere. AIRS data are improving weather forecasts and advancing our understanding of Earth's climate. AIRS is one of six instruments aboard Aqua, a satellite that is part of NASA's Earth Observing System. AIRS along with its partner microwave instrument the Advanced Microwave Sounding Unit, AMSU-A, represents the most advanced atmospheric sounding system ever deployed in space. Together these instruments observe the global water and energy cycles, climate variation and trends, and the response of the climate system to increased greenhouse gases.	Other		Global	2002	5	4	Ongoing			Eric Fetzer (JPL)	No
Aliso Canyon Study	Completed	NOAA		http://www.esrl.noaa.gov/csd/projects/aliscanyon.html		Field campaign		NW of Los Angeles	2015	10	NA	2016	2	NA		No
Aloha Cabled Observatory	Ongoing	NSF		http://aco-sds.soest.hawaii.edu/		Observing network		North Pacific Ocean	NA	NA	NA	NA	NA	NA		No
AmeriFlux Network	Ongoing	DOE		http://ameriflux.lbl.gov/	AmeriFlux is a network of PI-managed sites measuring ecosystem CO ₂ , water, and energy fluxes in North, Central and South America. It was established to connect research on field sites representing major climate and ecological biomes, including tundra, grasslands, savanna, crops, and conifer, deciduous, and tropical forests. As a grassroots, investigator-driven network, the AmeriFlux community has tailored instrumentation to suit each unique ecosystem. The network was launched in 1996, after an international workshop on flux measurements in La Thuile, Italy, in 1995, where some of the first year-long flux measurements were presented. Early support for the network came from many sources, including the U.S. Department of Energy's Terrestrial Carbon Program, the DOE's National Institute of Global Environmental Change (NIGEC), NASA, NOAA and the US Forest Service. The network grew from about 15 sites in 1997 to more than 110 active sites registered today. Sixty-one other sites, now inactive, have flux data stored in the network's database. In 2012, the U.S. DOE established the AmeriFlux Management Project (AMP) at Lawrence Berkeley National Laboratory (LBNL) to support the broad AmeriFlux community and the AmeriFlux sites.	Observing network		North America, Central America, South America	1996	NA	NA	Ongoing	Ongoing	Ongoing		No
AMOS (Arctic Mobile Observing System)	In Progress	ONR		https://www.onr.navy.mil/en/Science-Technology/Departments/Code-32/all-programs/arctic-global-prediction/AMOS-DB		Observing network		Arctic	2017	NA	NA	2021	NA	NA		No
AMSR-E (Advanced Microwave Scanning Radiometer for EOS) on the Aqua Satellite	Completed	NASA	JAXA	https://aqua.nasa.gov/content/amsc-e	The Advanced Microwave Scanning Radiometer for EOS (AMSR-E) is a twelve-channel, six-frequency, total power passive-microwave radiometer system. The AMSR-E instrument provides measurements of the following terrestrial, oceanic, and atmospheric parameters for the investigation of global water and energy cycles, including precipitation rate, sea surface temperature, sea ice concentration, snow water equivalent, soil moisture, surface wetness, wind speed, atmospheric cloud water, and water vapor.	Other		Global	2002	5	4	2011	10	4		No
AMSU-A (Advanced Microwave Sounding Unit) on the Aqua Satellite	Ongoing	NASA		https://aqua.nasa.gov/content/amsu	The Advanced Microwave Sounding Unit (AMSU-A), a 15-channel microwave sounder designed primarily to obtain temperature profiles in the upper atmosphere (especially the stratosphere) and to provide a cloud-filtering capability for tropospheric temperature observations. The first AMSU was launched in May 1998 on board the NOAA 15 satellite. The EOS AMSU-A is part of a closely coupled triplet of instruments that include the AIRS and HSB.	Other		Global	2002	5	4	Ongoing	Ongoing	Ongoing		No
AOML glider 4th mission	Completed	NOAA		http://www.aoml.noaa.gov/phod/news/round.php?pfullStory=20160310_20160310_glider_M04start.html		Glider mission		Caribbean Sea near Puerto Rico	2016	NA	NA	2016	NA	NA		No

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APART (Ammonia Phase Partitioning and Transport)	Planned	NSF		Coming soon	In this collaborative project between 2 institutions and 4 PIs, a 10-week field campaign is planned in the foothills of RMNP to determine (i) fluxes and deposition timescales of NH3 within 10 km downwind of large sources, and (ii) spatial distribution and partitioning of NHx ~100 km downwind of same sources. The main sampling platform is the University of Wyoming King Air (UWKA) research aircraft equipped with new measurement capabilities that allow for enhanced sampling strategies of gases and particulates. Gaseous species include reduced and oxidized nitrogen (NH3 and HNO3), methane (CH4), ethane (C2H6), carbon monoxide (CO), carbon dioxide (CO2) and water vapor (H2O), while particulates include aerosol concentration and size and their water-soluble species concentrations. CH4 and C2H6 allow to track the plume and distinguish between different source types. Integration of flight data with ground-based observations collected from mobile monitoring and existing sampling sites, provides a means to better interpret consistently available ground-based data in the future. Results will also contribute to improved representation of NH3 in transport models, help predict local air quality and inform stakeholders.	Airborne campaign		Wyoming/Colorado	2021							No
APPLICATE (Advanced Prediction in Polar regions and beyond: modelling, observing system design and linkages associated with a Changing Arctic climate)	In Progress					Observing network		Arctic	NA	NA	NA	NA	NA	NA		No
Argo	Ongoing	NOAA		http://www.argo.ucsd.edu/		Observing network		Global	NA	NA	NA	Ongoing	NA	NA		No
ARM (Atmospheric Radiation Measurement) - Southern Great Plains	Ongoing	DOE		https://www.arm.gov/capabilities/observatories/sgp	The Atmospheric Radiation Measurement (ARM) user facility, a DOE Office of Science user facility managed by the Office of Biological and Environmental Research, provides the climate research community with strategically located in situ and remote-sensing observatories designed to improve the understanding and representation, in climate and earth system models, of clouds and aerosols as well as their interactions and coupling with the Earth's surface. The Southern Great Plains (SGP) site consists of in situ and remote-sensing instrument clusters arrayed across approximately 9,000 square miles in north-central Oklahoma and south Kansas.	Observing site		Oklahoma	1993			Ongoing	Ongoing			
ARM (Atmospheric Radiation Measurement) HI-SCALE	Completed	DOE		https://www.arm.gov/campaigns/asf/2016hiSCALE	The Holistic Interactions of Shallow Clouds, Aerosols, and Land-Ecosystems (HI-SCALE) campaign was designed to provide a detailed set of measurements needed for a more complete understanding of the life cycle of shallow clouds by coupling cloud macrophysical and microphysical properties to land surface properties, ecosystems, and aerosols. HI-SCALE consisted of two four-week intensive observational periods, one in the spring and the other in the late summer to take advantage of different stages and distribution of greenness for various vegetation near the ARM Climate Research Facility's Southern Great Plains (SGP) site in Oklahoma, as well as aerosol properties that vary during the growing season. Most of the instruments were deployed on the ARM Aerial Facility (AAF) Gulfstream-159 (G-1) aircraft, including those that measure atmospheric turbulence, cloud water content and drop size distributions, aerosol precursor gases, aerosol chemical composition and size distributions, and cloud condensation nuclei concentrations. Aerosol microphysical property measurements supplemented routine ARM aerosol measurements made at the surface. The G-1 completed transects over the SGP Central Facility at multiple altitudes within the boundary layer, and within and above clouds.	Field campaign		Oklahoma	2016	4	NA	2016	9	NA		No
ARM (Atmospheric Radiation Measurement) LASIC	Completed	DOE		https://www.arm.gov/campaigns/arm/2016lasic	LASIC (Layered Atlantic Smoke Interactions with Clouds) is a field campaign to improve understanding of aged carbonaceous aerosol and the mechanisms by which clouds adjust to the presence of the aerosol. The first DOE Atmospheric Radiation Measurement (ARM) Mobile Facility's (AMF1) cloud, aerosol, and atmospheric profiling instrumentation is deployed to Ascension Island, located within the trade-wind shallow cumulus regime 3,000 kilometers offshore of continental Africa. This is within the latitude zone of the maximum outflow of biomass burning aerosol, and with the deepening boundary layer known to entrain free tropospheric smoke. The primary activities for LASIC are to: improve current knowledge on aged biomass-burning aerosol and its radiative properties; use surface-based remote sensing to sensitively examine the atmosphere for the relative vertical location of aerosol and clouds; improve understanding of the cloud adjustments to the presence of shortwave-absorbing aerosol within the vertical column, both through aerosol-radiation and aerosol-cloud interactions.	Field campaign		Southeast Atlantic Ocean	2016	6	1	2017	10	31		No
ARM (Atmospheric Radiation Measurement) MICRE	Completed	DOE		https://www.arm.gov/campaigns/arm/2016micre	Clouds over the Southern Ocean are poorly represented in present-day reanalysis products and global climate model simulations. Errors in top-of-atmosphere (TOA) broadband radiative fluxes in this region are among the largest globally, with significant implications for modeling both regional and global-scale climate responses. In response to the need for additional measurements of surface radiative fluxes, as well as cloud and aerosol properties over the Southern Ocean, the DOE ARM Climate Research Facility will deploy a variety of ground instrumentation to Macquarie Island, situated at 54.61 degrees south latitude and 158.87 degrees east longitude. It has a small research station operated by the Australian Antarctic Division (AAD) and manned year-round in part by the Australian Bureau of Meteorology (BoM). The Macquarie Island Cloud and Radiation Experiment will be conducted in coordination with AAD and BoM activities planned at this site.	Field campaign		Southern Ocean	2016	NA	NA	2018	NA	NA		No
ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) on the Terra Satellite	Ongoing	NASA	Japan Ministry of Economy, Trade and Industry (METI)			Other		Global								
ATom (Atmospheric Tomography Mission)	Completed	NASA	NOAA	https://espo.nasa.gov/home/atom	Earth Venture Suborbital campaign to study the impact of human-produced air pollution on greenhouse gases and on chemically reactive gases in the atmosphere. Deploys an extensive gas and aerosol payload on the NASA DC-8 aircraft for systematic, global-scale sampling of the atmosphere, profiling continuously from 0.2 to 12 km altitude.	Field campaign		Global	2016	7	NA	2018	5	NA		No
ATOMIC (Atlantic Tradewind Ocean–Atmosphere Mesoscale Interaction Campaign)	Completed	NOAA	NASA	https://www.esrl.noaa.gov/pod/atomic/	Campaigns: ATom-1 (Jul-Aug 2016), ATom-2 (Jan-Feb 2017), ATom-3 (Sep-Oct 2017), and ATom-4 (Apr-May 2018). From early January through mid-February 2020, NOAA is partnering with several universities and other programs to lead the Atlantic Tradewind Ocean–Atmosphere Mesoscale Interaction Campaign (ATOMIC). The field study will take place in the tropical North Atlantic east of Barbados and investigate cloud and air-sea interaction processes with the goal of advancing understanding and prediction of U.S. weather and climate. ATOMIC is the U.S. complement to the European field campaign called EURECA. This collaborative effort involves a unique combination of ships, piloted and remotely-controlled aircraft, and remotely-controlled ocean vehicles to characterize ocean and atmospheric properties. A suite of instruments will be deployed from NOAA's research ship Ronald H. Brown and WP-3D Orion "Hurricane Hunter" aircraft, and on land.	Field campaign		Barbados and surroundings	2020	1	NA	2020	2	NA		No
AVIRIS (Airborne Visible/Infrared Imaging Spectrometer) -NG India Campaign	Completed	NASA		http://aviris-ng.jpl.nasa.gov/	High signal to noise airborne imaging spectroscopy measurements across India including coastal zone; mangrove forests; Asia soils; Asian forests; hydrocarbon alteration; mineralogy; agriculture; urban; and calibration/validation.	Spaceborne		India Field Campaign but global	2015	12	17	2016	3	8	Woody Turner (NASA HQ)	No
AWARE (ARM West Antarctic Radiation Experiment)	Completed	DOE	NSF	http://www.arm.gov/campaigns/arm/2015aware	DOE and NSF partnered to deploy unique, advanced cloud, aerosol, and radiation instruments to Antarctica in November of 2015 for the Atmospheric Radiation Measurement (ARM) West Antarctic Radiation Experiment (AWARE). Two primary goals of the campaign are to understand atmospheric contributions to West Antarctic warming and surface melt and to improve understanding of the microphysics of mixed-phase clouds in Antarctica and their impact on the surface radiation budget.	Field campaign		Antarctica	2015	12	NA	2017	1	NA		No
BB-Flux	Completed	NSF		https://volkamergroup.colorado.edu/timeline/field/bb-flux	This campaign deployed the CU solar tracker and the CU SOF on the University of Wyoming King Air research aircraft. The objectives of the study were to: (1) Quantify emission fluxes of CO, CO2, other gases, and particle volume for different fuel types and burn conditions, and test atmospheric models; 2) Characterize plume injection height of plumes that travel decoupled from the ground (top of boundary layer, free troposphere), and evaluate predictions by atmospheric models; (3) Study radical sources and plume chemistry that leads to secondary production of O3, air toxics, and modifies the particle size distribution as plumes age; and (4) Explore synergistic benefits of remote sensing and in-situ observations to quantify speciated total emission fluxes from wildfires.	Airborne campaign		Western United States	2018	July		2018	September			No
CACTI (Cloud, Aerosol, and Complex Terrain Interactions)	Completed	DOE		https://www.arm.gov/campaigns/arm/2018cacti	The Cloud, Aerosol, and Complex Terrain Interactions (CACTI) field campaign in the Sierras de Córdoba mountain range of north-central Argentina deployed the DOE ARM Mobile Facility to improve understanding of cloud life cycle and organization in relation to environmental conditions so that cumulus, microphysics, and aerosol parameterizations in multiscale models can be improved. The Sierras de Córdoba has a high frequency of orographic boundary layer clouds, many reaching congestus depths, many initiating into deep convection, and some organizing into mesoscale systems uniquely observable from a single fixed site. Some systems even grow upscale to become among the deepest, largest, and longest-lived in the world. These systems likely contribute to an observed regional trend of increasing extreme rainfall, and poor prediction of them likely contributes to a warm, dry bias in climate models downstream of the Sierras de Córdoba in a key agricultural region. The CACTI campaign coordinated closely with the NSF-led RELAMPAGO campaign.	Field campaign		North-Central Argentina	2018	10	1	2019	4	30	Coordinated with NSF RELAMPAGO. Contact: Sally McFarlane, DOE	No
California Baseline Ozone Transport Study	Completed	NOAA		http://www.esrl.noaa.gov/csl/projects/cabots/		Field campaign		San Joaquin Valley	NA	NA	NA	NA	NA	NA		No

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CALiOP (Cloud-Aerosol Lidar with Orthogonal Polarization) on the CALIPSO Satellite	Ongoing	NASA	CNES	https://www.calipso.larc.nasa.gov/about/payload.php#CALiOP	CALiOP is a two-wavelength polarization-sensitive lidar that provides high-resolution vertical profiles of aerosols and clouds.	Instrument on satellite		Global	2006			Ongoing	Ongoing	Ongoing	David M. Winker (LaRC)	
CAMP2Ex (Clouds, Aerosol, and Monsoon Processes-Philippines Experiment)	Completed	NASA		https://espo.nasa.gov/camp2ex/content/CAMP2Ex	The Clouds, Aerosol, and Monsoon Processes-Philippines Experiment (CAMP2Ex) was a summer 2019 NASA airborne mission to characterize the role of anthropogenic and natural aerosol particles in modulating the frequency and amount of warm and mixed phase precipitation in the vicinity of the Philippines during the Southwest Monsoon.	Field campaign		Philippines	2019	NA	NA	2019	10	18	Hal Maring	No
CAMP2Ex (Cloud-Aerosol-Monsoon Philippines Experiment)	Completed	NASA		https://espo.nasa.gov/camp2ex/content/CAMP2Ex	The Cloud, Aerosol and Monsoon Processes Philippines Experiment (CAMP2Ex) is a response to the need to deconvolute the fields of tropical meteorology and aerosol science at the meso-to cloud level.	Field campaign		Philippines	2018	NA	NA	2019	NA	NA		No
CATS (Cloud-Aerosol Transport System)	Completed	NASA		https://cats.gsfc.nasa.gov/	The measurements of atmospheric clouds and aerosols provided by the CATS payload was used to provide near real-time (NRT) observations of aerosol vertical distribution as inputs to global models.	Instrument on International Space Station (ISS)		55N to 55S	2015	1	NA	2018	10	NA	Matthew McGill (NASA)	No
CERES (Cloud's and the Earth's Radiant Energy System) on the Aqua Satellite	Ongoing	NASA		https://aqua.nasa.gov/ceres	The Cloud's and the Earth's Radiant Energy System (CERES) is a 3-channel radiometer measuring reflected solar radiation in the 0.3-5 µm wavelength band, emitted terrestrial radiation in the 8-12 µm band, and total radiation from 0.3 µm to beyond 100 µm. These data are being used to measure the Earth's total thermal radiation budget, and, in combination with MODIS data, detailed information about clouds. The first CERES instrument was launched on the Tropical Rainfall Measuring Mission (TRMM) satellite in November 1997; the second and third CERES instruments were launched on the Terra satellite in December 1999; and the fourth and fifth CERES instruments are on board the Aqua satellite.	Instrument on satellite		Global	2002	5	4	Ongoing	Ongoing	Ongoing	Dr. Norman Loeb (LaRC)	
CERES (Cloud's and the Earth's Radiant Energy System) on the Terra Satellite	Ongoing	NASA		https://ceres.larc.nasa.gov/instruments/#ceres-instruments	The Cloud's and the Earth's Radiant Energy System (CERES) is a 3-channel radiometer measuring reflected solar radiation in the 0.3-5 µm wavelength band, emitted terrestrial radiation in the 8-12 µm band, and total radiation from 0.3 µm to beyond 100 µm. These data are being used to measure the Earth's total thermal radiation budget, and, in combination with MODIS data, detailed information about clouds. The first CERES instrument was launched on the Tropical Rainfall Measuring Mission (TRMM) satellite in November 1997; the second and third CERES instruments were launched on the Terra satellite in December 1999; and the fourth and fifth CERES instruments are on board the Aqua satellite.	Instrument on satellite		Global	1999	12		Ongoing	Ongoing	Ongoing	Dr. Norman Loeb (LaRC)	
CGWAVES (Convective Gravity Waves in the Stratosphere)	Planned	NSF		Coming soon	The collaborative research team will conduct a field campaign and associated modeling effort to increase understanding of convective gravity wave (CGW) dynamics and their role in atmospheric circulation, structure, and variability from Earth's surface to the stratosphere and above. Gravity waves that are generated by deep convection have not previously been quantified by full-column measurements. The CGWaves field campaign will be conducted in the central US in June 2022 using the NSF/NCAR G-V research aircraft. The G-V will make in situ measurements using tracers of vertical transport and mixing and remote sensing measurements of radial winds from 15-25km using a Na resonance lidar and temperature and perturbations from 25-60km via a Rayleigh lidar. OH airglow measurements at 85km will provide additional data about the atmospheric structure. Multiple numerical models will be used, including the WRF in idealized and real-case configurations, the GATS Complex Geometry Compressible Atmosphere Model (CGCAM) and ERAU Model for Acoustic-Gravity wave Interactions and Coupling (MAGIC) for CGW responses extending throughout the stratosphere, and the GATS spectral DNS models that can resolve instabilities and turbulence. The measurement campaign and analysis and modeling efforts would focus on four main science goals: 1) Measure and quantify CGW generation, propagation, and variability throughout the troposphere and stratosphere, 2) Identify and quantify the convective source dynamics that dictate CGW character and orientations for a variety of source conditions, 3) Quantify CGW refraction in variable winds, breaking and instability dynamics, mean-flow interactions, and their effects in the stratosphere for a range of environments, and 4) Advance the parameterizations of both CGW generation by WSR-88D measurements and the resulting CGW nonlinear dynamics and influences in the troposphere and stratosphere.	Airborne campaign		Central United States	2022							No
CHACHA (Chemistry in the Arctic-Clouds, Halogens, and Aerosols)	Planned	NSF		Coming soon	This project aims to improve understanding of atmospheric chemistry that impacts ozone, particulate matter, and cloud chemical composition in the context of a rapidly changing Arctic. The atmosphere converts pollutants by processing them into water-soluble products that are removed through precipitation (rain or snow) or by deposition onto Earth's surface. This chemical conversion of pollution happens through a sunlight-driven (photochemical) process known as oxidation. Most of what is known about these atmospheric processes comes from measurements made at the surface in Arctic coastal environments. The CHACHA team plans to use two instrumented aircraft to conduct airborne measurements around the Chukchi Sea, the Beaufort Sea, and the Alaska North Slope region. They plan to target features that are rapidly changing - above and downwind of sea ice "leads" (areas of open water in otherwise sea-ice covered ocean regions), and downwind of sources of combustion-derived pollutants. Researchers will also use collected data to develop atmospheric models that will be openly available for use by the broader scientific community. The team is composed of researchers at six United States universities (in Alaska, Indiana, Michigan, Pennsylvania, and New York) and will mentor a diverse group of students and postdoctoral scholars. Researchers will also engage in several additional education and outreach activities, including an "aircraft open house" and an annual three-day Science Fair in Utqiagvik, AK. Overall, this project will enable the United States to better understand how rapid change in the Arctic impacts the chemical composition of the atmosphere and to translate what was learned to other regions - including the atmosphere above the world's oceans and in Earth's upper atmosphere. In addition, this project is co-funded by the Arctic Natural Sciences and Atmospheric Chemistry programs.	Airborne campaign		Alaska	2022							No
CHEESEHEAD (Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors)	Completed	Multiple	NOAA, NASA, NSF	https://www.esd.ucar.edu/field_projects/cheesehead	The Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD) is an intensive field campaign designed specifically to address long-standing puzzles regarding the role of atmospheric boundary-layer responses to scales of spatial heterogeneity in surface-atmosphere heat and water exchanges.	Field campaign		Wisconsin	2019	6	24	2019	10	11	Ankur Desai (U of Wisc-Mad)	No
COMBLE (Cold-Air Outbreaks in the Marine Boundary Layer Experiment)	Completed	DOE	Met Norway	https://www.arm.gov/research/campaigns/amf2020comble	The main objective for COMBLE is to quantify the properties of boundary layer convection and air-mass transformations in cold-air outbreaks over open water in the Arctic. The ARM Mobile Facility will be deployed near Andenes, a town on an island in Northeastern Norway, while a reduced set of instruments will be deployed on Bear Island, located approximately mid-way between the Norway mainland and Svalbard. Specifically, COMBLE aims to describe and quantify the mesoscale organization and the vertical structure of boundary layer convection; examine the impact of varying aerosol conditions in the upstream Arctic boundary layer on cloud/precipitation processes, and provide integrated data sets of cold-air outbreaks that will enable high-resolution numerical simulations in order to evaluate and improve representations of shallow convection in cold-air outbreaks in weather and climate models.	Field campaign		Norway	2019	12	1	2020	5	31		
CONvecte TRAnsport of Active Species in the Tropics (CONTRAST)	Completed	NSF		https://www2.acom.ucar.edu/contrast		Airborne campaign		Tropical western Pacific Ocean / Guam within 1-15 km altitude	2014	1	NA	2014	2	NA		No
CORAL (Coral Reef Airborne Laboratory)	Ongoing	NASA		https://coral.jpl.nasa.gov/	Earth Venture Suborbital Coral Reef Airborne Laboratory (CORAL) is being deployed to study degradation of coral reefs using PRISM, an airborne instrument designed to observe hard-to-see coastal water phenomena.	Field campaign	airborne campaign	The Mariana Islands, Palau, Pacific Ocean; Hawaii, and the Great Barrier Reef	2015	4	1	Ongoing	NA	NA	Eric Hochberg (Bermuda Institute of Ocean Sciences)	No
COSMIC-2 (Second Constellation Observing System for Meteorology, Ionosphere, and Climate)	Completed	NASA	NOAA, Air Force, Taiwan's National Space Organization (NSPO), UCAR	http://www.cosmic.ucar.edu/cosmic2/	The UCAR COSMIC Program has been a leader in the retrieval and scientific application of GNSS, e.g. GPS, data since UCAR led the GPS-MET GPS radio occultation (RO) mission in the mid 1990s. It contributed to the design, management, and operation of the Constellation Observing System for Meteorology Ionosphere and Climate / FORMOSAT-3 (COSMIC-1) mission since 2006. The mission is still providing high-quality RO profiles that are having a significant positive impact on weather and space weather forecasting and research. The success of COSMIC has prompted U.S. agencies (led by NOAA) and Taiwan's National Space Organization to execute a COSMIC follow-on operational mission called COSMIC-2/FORMOSAT-7 (COSMIC-2) that places six satellites with next generation GNSS RO payloads into low Earth orbit.	Spaceborne		Global	2017	NA	NA	2018	NA	NA		No
CPR (Cloud Profiling Radar) on the CloudSat Satellite	Ongoing	NASA		https://cloudsat.atmos.colostate.edu/instrument	The main instrument on CloudSat is the Cloud Profiling Radar (CPR), a 94-GHz nadir-looking radar that measures the power backscattered by clouds as a function of distance from the radar.	Instrument on satellite		Global	2006			Ongoing	Ongoing	Ongoing	Graeme Stephens (JPL)	
CROPScape	Ongoing	USDA	NASA	https://nasseedata.gmu.edu/CropScape/	Provides crop-specific land cover data layer created annually for the continental United States using moderate resolution satellite imagery and extensive agricultural ground truth.	Field campaign		United States	1997	NA	NA	Ongoing	Ongoing	Ongoing	Rachel Melnick (USDA)	No
CYGNSS (Cyclone Global Navigation Satellite System)	In Progress	NASA		https://www.nasa.gov/cygnss	An Earth Venture Mission comprised of a constellation of eight small satellites carried to low-Earth orbit on a single launch vehicle to make accurate measurements of ocean surface winds in and near the eye of the storm throughout the lifecycle of tropical cyclones, typhoons and hurricanes.	Satellite constellation		Pan-tropical	2016	12	NA	NA	NA	NA	Barry Lefer, Hank Margolis (NASA)	No

Campaign/New Instrument Name [1]	Status	Primary Agency (Operating and/or Funding)	Partnering Agencies	URL	Description	Primary Observing Type	Secondary Observing Type	Study Area	Year Start	Month Start	Day Start	Year End	Month End	Day End	Contact	Long-Term Timeseries
Forest Inventory and Analysis Program	Ongoing	USDA		https://www.fia.fs.fed.us/	FIA reports on status and trends in forest area and location; in the species, size, and health of trees; in total tree growth, mortality, and removals by harvest; in wood production and utilization rates by various products; and in forest land ownership.	Surface measurement network		United States	1930	NA	NA	Ongoing	Ongoing	Ongoing	Elizabeth Burrill (USDA FS)	No
Free-Ascending Tripod Deployment in the South China Sea		USGS		http://soundwaves.usgs.gov/2014/10/29/201410.pdf		Instrument deployment		South China Sea at 1300 m depth	2014	4	1	NA	NA	NA		No
GEO-CAPE (Geostationary Coastal and Air Pollution Events)	In Progress	NASA		http://geo-cape.larc.nasa.gov/	GEO-CAPE measures tropospheric trace gases and aerosols and coastal ocean phytoplankton, water quality and biogeochemistry from geostationary orbit, providing multiple daily observations within the field of view. The GEO-CAPE mission satisfies science objectives for studies of both coastal ocean biophysics and atmospheric composition associated with air quality and short-lived climate forcers.	Spaceborne		North and South America as well as the adjacent oceans	NA	NA	NA	NA	NA	NA		No
Glider Surveys of the Gulf Stream during the 2019 Atlantic Hurricane Season	Completed	NOAA				Ocean surveys		Atlantic Ocean	2019	7	NA	2020	6	NA	Emily Smith	No
GLISTIN-A Kilauea Rapid Response	Completed	NASA		https://hyspiri.jpl.nasa.gov/airborne	A sequence of repeat flights during the 2018 eruption used GLISTIN to detect changes in Kilauea's topography associated with the new lava flows, with the goal of measuring the erupted volume as a function of time and ultimately the total volume of the event. Such observations are extremely useful to quantitatively evaluate models for evolution of volcanic processes.	Field campaign		Hawaii	2018	NA	NA	2018	NA	NA		No
GO-SHIP	Ongoing	NOAA		http://www.go-ship.org/		Observing network/field campaign		Global	NA	NA	NA	Ongoing	Ongoing	Ongoing		No
GO-SHIP S04P, GO-SHIP P06, GO-SHIP P18	Completed	NSF	NOAA; NSF, NOAA; NOAA, NSF, respectively	https://usgoship.ucsd.edu/	The GO-SHIP program carries out a systematic and global re-occupation of select hydrographic sections and provides approximately decadal resolution of the changes in inventories of heat, freshwater, carbon, oxygen, nutrients and transient tracers, covering the ocean basins from coast to coast and full depth (top to bottom).	Sustained effort/happens approx every 10 years		Southern Ocean, South Pacific Ocean, Pacific Ocean, respectively	2016	11	NA	2018	3	NA	Kathy Tedesco, NOAA	No
GOES-16 Field Campaign	Completed	NOAA	NASA	https://www.nesdis.noaa.gov/content/scientists-begin-field-campaign-noaa424580n9p9-goes-16	During this three-month campaign, a team of instrument scientists, meteorologists, GOES-16 engineers, and specialized pilots used a variety of high-altitude planes, ground-based sensors, unmanned aircraft systems (or drones), the International Space Station, and the NOAA/NASA Suomi NPP polar-orbiting satellite to collect measurements across the United States.	Field campaign	Satellite		2017	3		2017	5			No
GOES-R	Ongoing	NOAA	NASA	http://www.goes-r.gov/		Spaceborne		Global	2016	11	NA	NA	NA	NA		No
GOES-R (GOES-16) Launch	Ongoing	NOAA	NASA	http://www.goes-r.gov/mission/mission.html	The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the next generation of geostationary weather satellites, and a collaborative development and acquisition effort between NOAA and NASA to develop, launch and operate the satellites. The GOES-R series satellites provide continuous imagery and atmospheric measurements of Earth's Western Hemisphere, total lightning data, and space weather monitoring to provide critical atmospheric, hydrologic, oceanic, climatic, solar and space data.	Spaceborne		Western Hemisphere	2016	NA	NA	Ongoing	Ongoing	Ongoing		No
GOTHAMM (Greater New York (NY) Oxidant, Trace gas, Halogen, and Aerosol Airborne Mission)	Planned	NSF		Coming soon	In this collaborative field campaign, 14 investigators from 9 institutions intend to study air quality in the greater NYC region using NSF's C-130 research aircraft loaded with state-of-the-art instrumentation. Gases and particles will be collected during summer when air masses are influenced by emissions from nearby forests, ocean surfaces, and human activities. This new information will help increase understanding of formation of O3 and particulate matter (PM) pollution. By sharing and disseminating results, air quality agencies in the region and other similar mega cities can take action to mitigate harmful pollution.	airborne campaign		New York	2022							No
GPM (Global Precipitation Measurement)	Ongoing	NASA	JAXA	http://www.nasa.gov/mission_pages/GPM/main/index.html	The Global Precipitation Measurement mission is an international network of satellites that provide the next-generation global observations of rain and snow to advance our understanding of Earth's water and energy cycle, improve forecasting of extreme events, and provide accurate and timely information to directly benefit society.	Spaceborne		Global	2014	2	27	Ongoing	NA	NA	Scott A. Braun, Gail Skofronick-Jackson	No
GRACE (Gravity Recovery and Climate Experiment)	Completed	NASA		https://grace.jpl.nasa.gov/	The GRACE twin satellites, launched 17 March 2002, made detailed measurements of Earth's gravity field changes, providing information about Earth's water reservoirs over land, ice and oceans, as well as earthquakes and crustal deformations. GRACE completed more than 15 years of continuous measurements.	Satellite		LEO Orbit, Global	2002	3	NA	2017	10	NA		No
GRACE-FO (Gravity Recovery and Climate Experiment Follow-On)	Ongoing	NASA		https://gracefo.jpl.nasa.gov/	The Gravity Recovery and Climate Experiment Follow On (GRACE-FO) is a successor to the original GRACE mission, which orbited Earth from 2002-2017. GRACE-FO continues the work of tracking Earth's water movement to monitor changes in underground water storage, the amount of water in large lakes and rivers, soil moisture, ice sheets and glaciers, and sea level caused by the addition of water to the ocean.	Satellite		LEO Orbit, Global	2018	5	22	NA	NA	NA		No
Great Lakes Freshwater Flux	Ongoing	NOAA		https://www.esrl.noaa.gov/psd/news/2017/022717.html	ESRL/PSD recently developed a modified version of its Air-Sea Flux system for use in freshwater applications. The system will be used to improve the predictive understanding of Great Lakes evaporative processes relevant to water level prediction. An accurate knowledge of water levels is important to the Great Lakes shipping, fishing, and water recreation industries. In particular, the system will be used to measure atmospheric exchanges (or fluxes) of water and carbon dioxide across the Great Lakes. The system was installed on the Whitefish Bay, a bulk carrier ship belonging to the Canadian Steamship Lines, on March 1, 2017. Continuous routine measurements will be taken over the next two to three years as the ship transits the Great Lakes.	Observing site		Great Lakes	2017	3	NA	Ongoing	Ongoing	Ongoing		No
Gulf of Alaska Ocean Acidification (GoAOA) Survey 2015	Completed	NOAA		https://oceanacidification.noaa.gov/CurrentProjects/GulfOfAlaska/TabId/207/PID/14222/evl/0/7tagID/5977/TagName/Projects_GOA_Environment/Default.aspx	A 19-day OA survey cruise along the continental shelf of the Gulf of Alaska designed to fill observing gaps that have made it difficult to quantify the extent of OA events.	Field campaign/data collection cruise	Field campaign/laboratory	Gulf of Alaska	2015	7	NA	2015	8	NA	Jessica Cross, NOAA PMEL	No
Gulf of Mexico Ecosystems and Carbon Cruise 3 (GOMECC-3)	Completed	NOAA		https://www.aoml.noaa.gov/ocd/gcr/GOMECC3/	Executed by NOAA AOML on board the R/V Ronald H. Brown from Key West, FL into the Gulf of Mexico and then around the coastal waters of the Gulf of Mexico in a counterclockwise direction. The effort was in support of the coastal monitoring and research objectives of NOAA's Ocean Acidification Program. The cruise was designed to obtain a snapshot of key carbon, physical, and biogeochemical parameters as they relate to ocean acidification (OA) with the coastal margins.	Field campaign/data collection cruise	Field campaign/laboratory	Gulf of Mexico	2017	7	18	2017	8	21	Rik Wanninkhof (NOAA AOML)	No
HI-SCALE (Holistic Interactions of Shallow Clouds, Aerosols, and Land-Ecosystems)	Completed	DOE		https://www.arm.gov/campaigns/asf2016hiscasle	The Holistic Interactions of Shallow Clouds, Aerosols, and Land-Ecosystems (HI-SCALE) campaign was designed to provide a detailed set of measurements needed for a more complete understanding of the life cycle of shallow clouds by coupling cloud macrophysical and microphysical properties to land surface properties, ecosystems, and aerosols. HI-SCALE consisted of two four-week intensive observational periods, one in the spring and the other in the late summer to take advantage of different stages and distribution of greenness for various vegetation near the ARM Climate Research Facility's Southern Great Plains (SGP) site in Oklahoma, as well as aerosol properties that vary during the growing season. Most of the instruments were deployed on the ARM Aerial Facility (AAF) Gulfstream-159 (G-1) aircraft, including those that measure atmospheric turbulence, cloud water content and drop size distributions, aerosol precursor gases, aerosol chemical composition and size distributions, and cloud condensation nuclei concentrations. Aerosol microphysical property measurements supplemented routine ARM aerosol measurements made at the surface. The G-1 completed transects over the SGP Central Facility at multiple altitudes within the boundary layer, and within and above clouds.	Field campaign		Southern Great Plains	2016	4	NA	2016	9	NA	Sally McFarlane, DOE	No
HIRDLS (High Resolution Dynamics Limb Sounder) on the Aura Satellite	Completed	NASA		https://aura.gsfc.nasa.gov/hirdls.html	Overall science goals of HIRDLS are to observe the global distributions of temperature and several trace species in the stratosphere and upper troposphere at high vertical and horizontal resolution. The HIRDLS instrument can obtain profiles over most of the globe, both day and night. Complete Earth coverage can be obtained in twelve hours. Observations of the lower stratosphere and upper troposphere are possible through the use of special narrow and more-transparent spectral channels. After launch, activation of the HIRDLS instrument revealed that the optical path was blocked so that 20% of the aperture could view the earth's atmosphere. Engineering studies suggest that a piece of thermal blanketing material ruptured from the back of the instrument during the explosive decompression of launch. Attempts to remove this material mirror failed. However, even with the 80% blockage, measurements at high vertical resolution can be made at one scan angle. HIRDLS stopped taking data on March 17 2008 due to failure of the chopper unit.	Instrument on satellite		Global	2004	7	15	2008	3	17		
HSB (Humidity Sounder for Brazil) on the Aqua Satellite	Completed	NASA	Brazil National Institute for Space Studies	https://aqua.nasa.gov/content/hsb	The Humidity Sounder for Brazil (HSB), a 4-channel microwave sounder provided by Brazil aimed at obtaining humidity profiles throughout the atmosphere. The HSB is the instrument in the AIRS/AMSU-A/HSB triplet that allows humidity measurements even under conditions of heavy cloudiness and haze. The HSB provided high quality data until February 2003.	Instrument on satellite		Global	2002	5	4	2003	2	5		

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HyspIRI California Airborne Preparatory Campaigns - California, Hawaii	Ongoing	NASA		https://hyspiri.jpl.nasa.gov/airborne	NASA is flying the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) and the MODIS/ASTER Airborne Simulator (MASTER) instruments on a NASA ER-2 aircraft to collect precursor datasets to advance the Hyperspectral Infrared Imager (HyspIRI) mission concept. The primary goal of this activity is to demonstrate important science and applications research that is uniquely enabled by HyspIRI-like data, taking advantage of the contiguous spectroscopic measurements of the AVIRIS, the full suite of MASTER TIR bands, or combinations of measurements from both instruments.	Field campaign		California, Hawaii	2013	NA	NA	Ongoing	Ongoing	Ongoing		No
IASOA	Ongoing	NOAA			California (2013-ongoing) Hawaii (2017-2018) - NASA flew AVIRIS and MASTER (2017) as well as PRISM and HyTES (added in 2018) over the Hawaiian Islands to study changing coral reefs and volcanoes.			Arctic	NA	NA	NA	Ongoing	Ongoing	Ongoing		Yes
IASOA (International Arctic Systems for Observing the Atmosphere)	Ongoing	NOAA		https://www.esrl.noaa.gov/pod/iasoa/home2	IASOA coordinates the activities of individual Arctic observatories to provide a networked, observations-based view of the Arctic. The ultimate goal is to enhance the understanding of critical Arctic processes and improve their representation in polar prediction and forecast models.	Observing sites		Arctic	NA	NA	NA	Ongoing	Ongoing	Ongoing		No
ICARUS (Inaugural Campaigns for ARM Remote and Unmanned Systems)	Completed	DOE	NOAA	https://lar.science.energy.gov/meetings/stm/2016/presentations/233.pdf	October 2016 field campaign at Oliktok Point, Alaska that operated unmanned aircraft and made measurements of turbulence from a tethered balloon, both to study the evolution of the boundary layer structure during the fall transition season on the Alaskan coast.	Field campaign		Oliktok Point, Alaska	2016	10	NA	2017	3	NA		No
ICECAPS (Integrated Characterization of Energy, Clouds, Atmospheric state, and Precipitation at Summit)	Ongoing	NOAA	NSF, DOE	https://www.esrl.noaa.gov/pod/arctic/observatories/summit/		Observing network		Summit, Greenland	2010	NA	NA	Ongoing	Ongoing	Ongoing		No
ICESat-2 (Ice, Cloud, and Land Elevation Satellite-2)	Ongoing	NASA		https://icesat-2.gsfc.nasa.gov/	ICESat-2 is a continuation of ICESat and Operation IceBridge. The satellite carries a single instrument - the Advanced Topographic Laser Altimeter System (ATLAS), which measures the elevation of ice sheets, glaciers and sea ice, as well as measures the heights across Earth's temperate and tropical regions, and takes stock of the vegetation in forests worldwide.	Spaceborne		Greenland and Antarctica	2017	NA	NA	Ongoing	Ongoing		Doug McLennan (NASA)	No
IIR (Imaging Infrared Radiometer) on the CALIPSO Satellite	Ongoing	NASA	CNES	https://www.calipso.larc.nasa.gov/about/payload.php#CALIOP	The WFC is a modified version of the commercial off-the-shelf Ball Aerospace CT-633 star tracker camera. It is a fixed, nadir-viewing imager with a single spectral channel covering the 620-670 nm region, selected to match band 1 of the MODIS (MODerate resolution Imaging Spectroradiometer) instrument on Aqua. WFC probes the vertical structure and properties of thin clouds and aerosols over the globe. Relevant focus areas include Atmospheric Composition, Climate Variability and Change, Water and Energy Cycles, and Weather.	Instrument on satellite		Global	2006			Ongoing	Ongoing	Ongoing	David M. Winker (LaRC)	
IMPACTS (Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms)	In Progress	NASA		https://espo.nasa.gov/impacts	IMPACTS is a NASA Earth Venture Suborbital campaign providing observations critical to understanding the mechanisms of snowband formation, organization, and evolution.	Field campaign	airborne campaign	U.S. East Coast	2019	1	1	2023	12	31	Lynn McMurdie (University of Washington)	
IODP (International Ocean Discovery Program)	Ongoing	NSF		http://www.iodp.tamu.edu/		Field campaign		Global	NA	NA	NA	Ongoing	Ongoing	Ongoing		No
ISS-RapidScat (International Space Station Rapid Scatterometer)	Completed	NASA		https://www.jpl.nasa.gov/missions/international-space-station-rapid-scatterometer-iss-rapidcat/	The ISS-RapidScat instrument was a speedy and cost-effective replacement for NASA's QuikScat Earth satellite, which monitored ocean winds to provide essential measurements used in weather predictions, including hurricane monitoring. During its mission, ISS-RapidScat also provided new insights into research questions such as how changing winds over the Pacific drive changes in sea surface temperature during the 2015-2016 El Niño event. Due to its unique ability to sample winds at different times of day, its data will be useful to scientists for years to come.	Instrument on International Space Station (ISS)		Global	2014	9	21	2016	11	18		No
JASON-3	Ongoing	NASA	NOAA	http://sealevel.jpl.nasa.gov/missions/jason3/	Jason-3 is the fourth mission in U.S.-European series of satellite missions that measure the height of the ocean surface. These measurements provide scientists with critical information about circulation patterns in the ocean and about both global and regional changes in sea level and the climate implications of a warming world.	Spaceborne		Global	2016	1	17	Ongoing	NA	NA	Josh Willis (JPL)	No
JPSS-1	Ongoing	NOAA	NASA	http://www.jpss.noaa.gov/		Spaceborne		Global	2017	NA	NA	Ongoing	Ongoing	Ongoing		No
JPSS-2 (Joint Polar Satellite System-2)	Planned	NASA	NOAA	http://ecospo.nasa.gov/missions/joint-polar-satellite-system-2	The Joint Polar Satellite System (JPSS) is the restructured civilian portion of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) that will make afternoon observations as it orbits Earth. The system includes the satellites and sensors supporting civil weather and climate measurements and a shared ground infrastructure with the Department of Defense weather satellite system.	Spaceborne	Spaceborne	Global	2021	NA	NA	NA	NA	NA	Roger Clason (NASA)	No
June 2014 Fire Island Field Campaign	Completed	USGS		http://soundwaves.usgs.gov/2014/10/20/W201410.pdf		Field campaign		Fire Island, New York	2014	6	1	2014	6	1		No
KORUS-AQ (Korea U.S.-Air Quality)	Completed	NASA		https://espo.nasa.gov/home/korus-aq/content/KORUS-AQ	An international cooperative air quality airborne study in Korea to examine sources and dynamics of regional air pollution.	Field campaign		South Korea	2018	NA	NA	2019	NA	NA		No
LAFE (Land Atmosphere Feedback Experiment)	Completed	DOE	NOAA, NASA, Germany	http://www.arm.gov/research/campaigns/sgp2017/lafe	The Land Atmosphere Feedback Experiment (LAFE) will deploy several state-of-the-art scanning lidar and remote sensing systems to the DOE ARM Southern Great Plains (SGP) site in Oklahoma to study feedback processes between the land surface and the atmosphere. These processes are important for understanding the initiation and development of convection. The novel synergy of remote sensing systems will provide unique information on the impact of spatial inhomogeneities of the land surface and horizontal and vertical transport processes in the convective boundary layer. The simultaneous measurements of surface and entrainment fluxes, as well as the daily cycle of the thermodynamic state of the convective boundary layer, will provide a unique data set for characterizing land surface-atmosphere interaction on the dependence of large-scale and local conditions such as soil moisture and vegetation state. The measurements will also be applied for the development of improved parameterizations of surface fluxes and turbulence in the convective boundary layer. The results will be used for verifying simulations of land-atmosphere feedbacks in large-eddy simulation and mesoscale models; this experiment will strongly contribute to the improvement of the representation of the convective boundary layer in weather, climate, and earth system models.	Field campaign		Oklahoma	2017	8	1	2017	8	31		No
LIS (Lightning Imaging Sensor)	Completed	NASA		https://ecospo.nasa.gov/missions/lightning-imaging-sensor-lis	An Earth Venture Instrument Mission. It is the flight spare for the TRMM satellite has been delivered to the International Space Station (ISS) for a two year or longer mission to observe global lightning. LIS on ISS will not only extend the 17-year record of tropical lightning observations from TRMM, but will expand the latitudinal coverage to higher latitudes missed by TRMM -- now observing lightning to 55 degrees latitude North and South.	Instrument on International Space Station (ISS)		Between 55N and 55S	2017	2	NA	NA	NA	NA		No
LMOS (Lake Michigan Ozone Study 2017)	Completed	NASA	NOAA	https://www.air.larc.nasa.gov/missions/lmos/index.html , http://www.ssec.wisc.edu/news/articles/9012	The Lake Michigan Ozone Study 2017 (LMOS 2017) was commissioned to fill in important knowledge gaps about ozone formation along the lakeshore to monitor and assess air quality and to support states in their discussions of air quality issues and in their development of State Implementation Plans (SIPs) to mitigate air quality problems.	Field campaign		Upper Midwest	2017	5	22	2017	6	22		No
MARCUS (Measurements of Aerosols, Radiation, and Clouds over the Southern Ocean)	Completed	DOE		http://www.arm.gov/campaigns/amf2017marcus	The Measurements of Aerosols, Radiation, and Clouds over the Southern Ocean (MARCUS) campaign will install the DOE Atmospheric Radiation Measurement (ARM) second Mobile Facility (AMF2) on the Australian Antarctic supply vessel Aurora Australis (AA) as it routinely travels between Hobart, Australia, and the Antarctic, visiting the Australian Antarctic stations Mawson, Davis, and Casey. The MARCUS observations capture the variability in aerosol and cloud properties across the SO from spring to autumn, especially in cold waters at latitudes poleward of 60 degrees south, where supercooled and mixed-phase boundary layer clouds in the cold sector of cyclones are frequent. The data to be obtained during MARCUS under a range of synoptic settings will document how temperature-dependent distributions of cloud properties and frequency of supercooled water vary with concentrations of cloud condensation nuclei (CCN) and ice nucleating particles (INPs.) synoptic regime, latitude, and season. MARCUS data will also help in understanding the sources, sinks, and variability of CCN and INPs, the increased bias of absorbed shortwave radiation in summer in models, and conditions conducive to extensive supercooled water.	Field campaign		Southern Ocean: Hobart, Australia to Antarctica	2017	10	NA	2018	4	NA	Sally McFarlane, DOE	No
MarineGEO Field Campaign at CBC	Ongoing	Smithsonian		http://www.sms.si.edu/Newsletters/SMSNews_FallWinter_2015.pdf		Field campaign		near Carrie Bow Cay Field Station, Belize	NA	NA	NA	NA	NA	NA		No
MARS (Monterey Accelerated Research System) Cabled Observatory	Ongoing	NSF		http://www.mbari.org/at-sea/cabled-observatory/		Observing network		Monterey Bay, California	NA	NA	NA	Ongoing	Ongoing	Ongoing		No

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MethaneAIR	Delayed	NSF		https://www.esol.ucar.edu/field_projects/methaneair	The goal of this project is to test a newly developed instrument, named MethaneAIR, on the NSF Gulfstream-V aircraft. This new instrument will measure carbon dioxide and methane in the atmosphere at a higher resolution than previously possible. The design and acquisition of MethaneAIR is funded by the Environmental Defense Fund (EDF) and private philanthropy, as part of the EDF International Methane project. MethaneAIR will provide new observing technology and research infrastructure for the atmospheric science community as well as opportunities for student education and research training and public engagement with science and technology.	Airborne campaign		Colorado	2021							No
MISO-BOB (Monsoon Intra-Seasonal Oscillations in the Bay of Bengal)	In Progress	ONR		http://www.onr.navy.mil/en/Science-Technology/Departments/Code-32/All-Programs/Atmosphere-Research-322/Physical-Oceanography/NISO-BOB%20Rti.aspx		Field campaign		Indian Ocean	2017	NA	NA	2021	NA	NA		No
MISR (Multi-angle Imaging Spectroradiometer) on the Terra Satellite	Ongoing	NASA		https://www-misr.jpl.nasa.gov/	MISR provides new types of information for scientists studying Earth's climate, such as the partitioning of energy and carbon between the land surface and the atmosphere, and the regional and global impacts of different types of atmospheric particles and clouds on climate. The change in reflection at different view angles affords the means to distinguish different types of atmospheric particles (aerosols), cloud forms, and land surface covers. Combined with stereoscopic techniques, this enables construction of 3-D models and estimation of the total amount of sunlight reflected by Earth's diverse environments.	Instrument on satellite		Global	2000	3		Ongoing	Ongoing	Ongoing	David Diner (JPL)	
MITTS	Completed	NSF		https://www.esol.ucar.edu/field_projects/mitts		Field campaign		Tampa, Florida	2016	8	NA	2016	10	NA		No
MLS (Microwave Limb Sounder) on the Aura Satellite	Ongoing	NASA		https://aura.gsfc.nasa.gov/mls.html	The Earth Observing System (EOS) Microwave Limb Sounder (MLS) is one of four instruments on the NASA's EOS Aura satellite, launched on July 15th 2004. More information about Aura's science contributions can be found here. MLS makes measurements of atmospheric composition, temperature, humidity and cloud ice that are needed to (1) track stability of the stratospheric ozone layer, (2) help improve predictions of climate change and variability, and (3) help improve understanding of global air quality. MLS observes thermal microwave emission from Earth's "limb" (the edge of the atmosphere) viewing forward along the Aura spacecraft flight direction, scanning its view from the ground to ~90 km every ~25 seconds.	Instrument on satellite		Global	2004	7	15	Ongoing	Ongoing	Ongoing	Dr. Nathaniel J. Livesey (JPL)	
MOCA (Methane emissions from Arctic Ocean to the Atmosphere: Present and Future Climate Effects)	Completed	USGS		http://moca.nyu.no/		Field campaign		Arctic	2013	NA	NA	NA	NA	NA		No
MOCHA (Meridional Overturning Circulation and Heat Flux Array)	Ongoing	NSF	NOAA	http://www.sams.miami.edu/users/mocha/		Observing network/field campaign		North Atlantic	2014	NA	NA	Ongoing	Ongoing	Ongoing		No
MODIS (Moderate Resolution Imaging Spectroradiometer) on the Aqua Satellite	Ongoing	NASA		https://modis.gsfc.nasa.gov/	MODIS (or Moderate Resolution Imaging Spectroradiometer) is a key instrument aboard the Terra (originally known as EOS AM-1) and Aqua (originally known as EOS PM-1) satellites. Terra's orbit around the Earth is timed so that it passes from north to south across the equator in the morning, while Aqua passes south to north over the equator in the afternoon. Terra MODIS and Aqua MODIS are viewing the entire Earth's surface every 1 to 2 days, acquiring data in 36 spectral bands, or groups of wavelengths (see MODIS Technical Specifications). These data will improve our understanding of global dynamics and processes occurring on the land, in the oceans, and in the lower atmosphere. MODIS is playing a vital role in the development of validated, global, interactive Earth system models able to predict global change accurately enough to assist policy makers in making sound decisions concerning the protection of our environment.	Instrument on satellite		Global	2002	5	4	Ongoing	Ongoing	Ongoing	Michael King (LASP)	
MODIS (Moderate Resolution Imaging Spectroradiometer) on the Terra Satellite	Ongoing	NASA		https://modis.gsfc.nasa.gov/	MODIS (or Moderate Resolution Imaging Spectroradiometer) is a key instrument aboard the Terra (originally known as EOS AM-1) and Aqua (originally known as EOS PM-1) satellites. Terra's orbit around the Earth is timed so that it passes from north to south across the equator in the morning, while Aqua passes south to north over the equator in the afternoon. Terra MODIS and Aqua MODIS are viewing the entire Earth's surface every 1 to 2 days, acquiring data in 36 spectral bands, or groups of wavelengths (see MODIS Technical Specifications). These data will improve our understanding of global dynamics and processes occurring on the land, in the oceans, and in the lower atmosphere. MODIS is playing a vital role in the development of validated, global, interactive Earth system models able to predict global change accurately enough to assist policy makers in making sound decisions concerning the protection of our environment.	Instrument on satellite		Global	2000	3		Ongoing	Ongoing	Ongoing	Michael King (LASP)	
MOPITT (Measurements of Pollution in the Troposphere) on the Terra Satellite	Ongoing	NASA	Canadian Space Agency	https://mopitt.physics.utoronto.ca/	The MOPITT (Measurements of Pollution in The Troposphere) instrument was the first space based instrument that targeted measurements of carbon monoxide (CO) continuously on a global scale.	Instrument on Satellite		Global	2000	3		Ongoing	Ongoing	Ongoing	James Drummond (Dalhousie University)	
MOSAIC	In Progress	NOAA	DOE, NSF, NASA	www.mosaic-expedition.org	The Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) will be a year-long expedition into the central Arctic exploring the Arctic coupled climate system. The science is specifically focused on the changing Arctic sea ice, its interactions with the atmosphere and ocean, and its implication on the ecosystem. NOAA-PSD is specifically involved in measuring surface energy fluxes, studying coupled atmosphere-surface processes, and running quasi-operational sea-ice forecasts, among other activities. All activities are specifically designed to support improved weather and sea-ice forecasting and climate prediction. The project has been designed by an international consortium of leading polar research institutions, under the umbrella of the International Arctic Science Committee (IASC), led by the German Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) and the University of Colorado/NOAA Cooperative Institute for Research in Environmental Sciences (CIRES).	Field campaign		Arctic	2019	NA	NA	2020	NA	NA	Matthew Shupe, NOAA	No
MPLNet (Micro-Pulse Lidar Network)	Ongoing	NASA		https://mplnet.gsfc.nasa.gov/	The NASA Micro-Pulse Lidar Network (MPLNET) is a federated network of Micro-Pulse Lidar (MPL) systems designed to measure aerosol and cloud vertical structure, and boundary layer heights. The data are collected continuously, day and night, over long time periods from sites around the world. Most MPLNET sites are co-located with sites in the NASA Aerosol Robotic Network (AERONET). MPLNET is also a contributing network to the World Meteorological Organization (WMO) Global Atmospheric Watch (GAW) Aerosol Lidar Observation Network, GALION.	Ground network		Global	2000			Ongoing	Ongoing	Ongoing	Dr. Ellsworth Judd Welton (NASA)	
Muskegon Lake Buoy Observatory	Ongoing	EPA	NOAA	http://www.gvsu.edu/leri/buoy/		Observing network		Lake Muskegon, Michigan	2010	NA	NA	Ongoing	Ongoing	Ongoing		Yes
NaaMES (North Atlantic Aerosols and Marine Ecosystems Study)	Completed	NASA		http://naames.larc.nasa.gov/	Five year investigation to resolve key processes controlling ocean system function, their influences on atmospheric aerosols and clouds in the North Atlantic and their implications for climate.	Spaceborne/field campaign		North Atlantic	2015	1	15	2019	11	12	Mike Behrenfeld (Oregon State University)	No
NASCAR (Northern Arabian Sea Circulation) - autonomous research	Completed	ONR		http://www.onr.navy.mil/en/Science-Technology/Departments/Code-32/All-Programs/Atmosphere-Research-322/Physical-Oceanography/North-Arabian-Sea-Circulation.aspx		Field campaign		Indian Ocean	2015	NA	NA	2019	NA	NA		No
NDACC (Network for the Detection of Atmospheric Composition Change)	Ongoing	NASA		http://www.ndacc.org/	The International Network for the Detection of Atmospheric Composition Change (NDACC) is composed of more than 70 globally distributed, ground-based, remote-sensing research stations with more than 160 currently active instruments providing high quality, consistent, standardized, long-term measurements of atmospheric temperatures and trace gases, particles, spectral UV radiation reaching the Earth's surface, and physical parameters for detection of trends in overall atmospheric composition, understanding their impacts on the stratosphere, troposphere, and mesosphere, establishing links between climate change and atmospheric composition, testing and validating atmospheric measurements from satellites, supporting process-focused scientific field campaigns, and testing and improving theoretical models of the atmosphere.	Ground network		Global	1991	1		Ongoing	Ongoing	Ongoing	Dr. Anne M. Thompson (GSFC)	
NEON (National Ecological Observatory Network)	Ongoing	NSF		http://www.neonscience.org/		Observing network		United States	NA	NA	NA	NA	NA	NA		No
New Regional Class Research Vessels	In Progress	NSF		http://ceos.oregonstate.edu/ships/rcrv/				U.S. Coastal Regions	NA	NA	NA	NA	NA	NA		No

Campaign/New Instrument Name [1]	Status	Primary Agency (Operating and/or Funding)	Partnering Agencies	URL	Description	Primary Observing Type	Secondary Observing Type	Study Area	Year Start	Month Start	Day Start	Year End	Month End	Day End	Contact	Long-Term Timeseries
NGEE (Next-Generation Ecosystem Experiment)-Tropics	In Progress	DOE		http://hes.science.energy.gov/research/ngeetropics.shtml	Tropical forests cover less than 7% of Earth's surface but exchange vast amounts of CO ₂ , water, and energy with the atmosphere. They are the world's most important land-based carbon sinks, helping to regulate the Earth's climate. However, scientists are uncertain how tropical forests will respond to a warming climate and changing atmosphere, and if they will continue to act as a net carbon sink over the coming decades. Understanding the responses of tropical forests to global changes is critical for improving model projections of future climate. The Next-Generation Ecosystem Experiments-Tropics, or NGEE-Tropics, is a ten-year, multi-institutional project funded by the U.S. Department of Energy (DOE). NGEE-Tropics aims to fill the critical gaps in knowledge of tropical forest-climate system interactions. The overarching goal of NGEE-Tropics is to develop a predictive understanding of how tropical forest carbon balance and climate system feedbacks will respond to changing environmental drivers over the 21st Century.	Field campaign		Tropics	2015	NA	NA	2025	NA	NA		No
NGEE (Next-Generation Ecosystem Experiments)-Arctic	In Progress	DOE		http://ngee-arctic.ornl.gov/		Field campaign		Arctic	2012	NA	NA		2022	NA	NA	
NIMBLEs (New Instruments for Making Bottom Boundary Layer Evaluations) off Martha's Vineyard	Completed	USGS		http://soundwaves.usgs.gov/2014/10/29/201410.pdf		Field campaign/data collection cruise		near Martha's Vineyard, Massachusetts	2014	7	NA	2014	9	NA		No
NOAA Hydrometeorology Testbed	Ongoing	NOAA		http://journals.ametsoc.org/doi/abs/10.1175/JTECH-D-12-00217.1	The NOAA Hydrometeorology Testbed (HMT) is a joint OAR-NWS testbed motivated to make communities more resilient to the impacts of extreme precipitation on lives, property, water supply and ecosystems. HMT is co-managed by the OAR Physical Sciences Division, and the NWS Weather Prediction Center in partnership with the National Water Center.	Testbed			NA	NA	NA	Ongoing	Ongoing	Ongoing		No
NOAA Ozone Hole Observations	Ongoing	NOAA		http://www.esrl.noaa.gov/gmd/dv/spo_o3/	March 2017 installation of an ice-forming nucleus filter sampler at Oliktok Point, Alaska for understanding the aerosols that lead to ice formation in Arctic clouds.	Spaceborne		Ozone hole	NA	NA	NA	NA	NA	NA		No
NOAA PMEL global network of carbon dioxide time-series observations	Ongoing	NOAA		https://www.pmel.noaa.gov/co2/story/Buoys+and+Autonomous+Sensors	The primary mission of this project is to evaluate the variability in air-sea CO ₂ fluxes by conducting high resolution time-series measurements of atmospheric boundary layer and surface ocean CO ₂ partial pressure (pCO ₂). A subset of this observing system comprises the NOAA Ocean Acidification Observing Network (NOA-ON) which is a prominent U.S. contribution to the Global Ocean Acidification Observing Network (GOA-ON)	Research observing network	in situ ocean sensors	Global	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Adrienne Sutton, NOAA PMEL	Yes
NSF Cloud Map	Completed	DOE	NSF	https://www.arm.gov/campaigns/snp2016nsfucm		Field campaign		Southern Great Plains	2016	10	NA	2017	NA	NA		No
Observations of Fire's Impact on the southeast Atlantic Region	Completed	NSF		http://nsf.gov/awardsearch/showAward?AWD_ID=1528249&HistoricalAwards=false		Field campaign		Southeast Atlantic Ocean	NA	NA	NA	NA	NA	NA		No
OCO-2 (Orbiting Carbon Observatory-2)	Ongoing	NASA		http://oco.jpl.nasa.gov/	The OCO-2 Project primary science objective is to collect the first space-based measurements of atmospheric carbon dioxide with the precision, resolution and coverage needed to characterize its sources and sinks and quantify their variability over the seasonal cycle.	Spaceborne		Global	2014	NA	NA	Ongoing	NA	NA	Mark Garcia (JPL)	No
OCO-3 (Orbiting Carbon Observatory-3)	Ongoing	NASA		https://oco3.jpl.nasa.gov/	OCO-3 is a NASA-directed mission on the International Space Station (ISS). The primary mission objective is to collect the space-based measurements needed to quantify variations in the column averaged atmospheric carbon dioxide (CO ₂) dry air mole fraction, XCO ₂ , with the precision, resolution, and coverage needed to improve our understanding of surface CO ₂ sources and sinks (fluxes) on regional scales (≥1000 km). The precision requirement is identical to that of OCO-2.	Spaceborne		Global	2019	5	4	Ongoing	NA	NA	Ralph Basilio (JPL)	No
Oceanus Explorer Program	Ongoing	NOAA		http://oceanexplorer.noaa.gov/oceanus/welcome.html		Ship for data collection cruises			NA	NA	NA	NA	NA	NA		No
OMG (Oceans Melting Greenland)	In Progress	NASA		https://omg.jpl.nasa.gov/portal/	Observes changing water temperatures on the continental shelf surrounding Greenland, and how marine glaciers react to the presence of warm, salty Atlantic Water.	Field campaign		Greenland	2015	NA	NA	2020	NA	NA	Josh Willis (JPL)	No
OMI (Ozone Monitoring Instrument) on the Aura Satellite	Ongoing	NASA	Netherlands's Agency for Aerospace Program (NIVR), Finnish Meteorological Institute (FMI)	https://aura.gsfc.nasa.gov/omi.html	The Ozone Monitoring Instrument (OMI) instrument can distinguish between aerosol types, such as smoke, dust, and sulfates, and measures cloud pressure and coverage, which provides data to derive tropospheric ozone. OMI continues the TOMS record for total ozone and other atmospheric parameters related to ozone chemistry and climate. OMI measurements are highly synergistic with the other instruments on the Aura platform. The OMI instrument employs hyperspectral imaging in a push-broom mode to observe solar backscatter radiation in the visible and ultraviolet. The hyperspectral capabilities improve the accuracy and precision of the total ozone amounts and also allow for accurate radiometric and wavelength self calibration over the long term. The instrument is a contribution of the Netherlands's Agency for Aerospace Programs (NIVR) in collaboration with the Finnish Meteorological Institute (FMI) to the Aura mission.	Instrument on satellite		Global	2004	7	15	Ongoing			Prof. Dr. Pieternel Levelt (Royal Netherlands Meteorological Institute KNMI)	
OOI (Ocean Observatories Initiative)	Ongoing	NSF		http://oceanobservatories.org/	On June 19th, 2018 the R/V Roger Revelle departed Newport, OR to begin VISIONS'18, a 47-day expedition to replace and maintain elements of the Cabled Array off the coasts of Oregon and Washington as well as to add some novel sensors. This is the fourth Operations and Maintenance cruise for the Cabled Array implementing organization, as part of the National Science Foundation's (NSF) Ocean Observatories Initiative. Similar to previous O&M cruises, this expedition is highly complex with a diverse array of >100 instruments, junction boxes, and instrumented pods on the Shallow Profiler Moorings to be recovered, installed, and tested. The cruise will also include recovery and reinstallation of cabled Deep Profiler Moorings that reach ~10,000 feet beneath the oceans surface. Using a fleet of research aircraft, NASA's Operation IceBridge images Earth's polar ice to better understand connections between polar regions and the global climate system. IceBridge studies annual changes in thickness of sea ice, glaciers and ice sheets.	In situ ocean sensors		U.S. Coastal Regions; 4 High Latitude Global Deep Ocean sites	NA	NA	NA	Ongoing	Ongoing	Ongoing	Bob Houtman (NSF).	No
Operation IceBridge	Completed	NASA		https://www.nasa.gov/mission_pages/icebridge/		Field campaign		Arctic	2009	NA	NA	2016	NA	NA		No
ORACLES (Observations of Aerosols above Clouds and their Interactions)	Completed	NASA		https://espo.nasa.gov/home/oracles/content/ORACLES	ORACLES experiment provides multi-year airborne observations over the complete vertical column of the key parameters that drive aerosol-cloud interactions in the SE Atlantic, an area with some of the largest inter-model differences in aerosol forcing assessments on the planet.	Field campaign		Southeast Atlantic, Namibia/St. Helena	2016	NA	NA	NA	NA	NA	Jens Redemann (NASA)	No
ORCAS	Completed	NSF		https://www.esol.ucar.edu/field_projects/orcas		Field campaign		Southern Ocean	2016	1	NA	2016	2	NA		No
OSNAP (Overturning in the Subpolar North Atlantic)	Ongoing	NSF		http://www.o-snap.org/		Observing network/field campaign		North Atlantic	2014	NA	NA	NA	NA	NA		No
Perdigão	Completed	NSF		https://www.esol.ucar.edu/field_projects/perdigao/C3NA3o	This is a joint campaign with a European Commission project on wind energy resources. The US component includes a number of tower installations, wind lidars, and other instruments to characterize the flow in a unique double-hill region in Portugal.	Field campaign		Portugal	2016	12	NA	2017	6	NA		No
PGN (Pandonia Global Network)	In Progress	NASA	EPA, ESA	https://www.pandonia-global-network.org/	Presently, the NASA Pandora Project and ESA-Pandonia are collaborating to coordinate and facilitate an expanding global network of standardized, calibrated Pandora instruments focused on air quality and atmospheric composition. This effort is known as the Pandonia Global Network (PGN) which endeavors to ensure systematic processing and dissemination of the data to the greater global community in support of in-situ and remotely sensed AQ monitoring.	Ground network	Satellite	Global	2015						Robert Swap	

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PISTON (Propagation of Intra-Seasonal Tropical Oscillations)	Completed	ONR		http://onrpiston.colostate.edu/	Modeling and observational efforts within PISTON have been designed to target the multi-scale complexity of the summertime atmosphere in the Asian monsoonal region. The PISTON campaign emphasizes two scientific questions: How do localized features such as island orography and individual thunderstorms influence tropical intraseasonal oscillations? How does variability in large-scale circulations over the South China Sea influence the diurnal cycle, synoptic systems, and interactions between the atmosphere and ocean within the Maritime Continent? The R/V Thomas G. Thompson, owned by the Office of Naval Research, will be a primary station for field operations during PISTON. The Thomas G. Thompson will carry polarimetric and Doppler radar, and will be a platform for other observational activities. Atmospheric profiles will be sampled by launching radiosondes, or weather balloons, from the boat's deck, and additional instruments will be used to sample atmospheric aerosols, air-sea fluxes, and upper-oceanic characteristics.	Field campaign		Indian Ocean, South China Sea, Western Pacific Ocean	2018	NA	NA	2018	NA	NA		No
POSIDON (NASA Pacific Oxidants, Sulfur, Ice, Dehydration, and cONvection)	Completed	NASA		https://espo.nasa.gov/posidon/content/POSIDON_0	A focused airborne science mission to study the OH and sulfur chemistry, cirrus clouds, and dehydration in the tropical upper troposphere and lower stratosphere over the western Pacific.	Field campaign		Western Pacific Ocean	2016	10	1	2016	10	NA	Barry Lefer, Hank Margolis (NASA)	No
PRECIP (Prediction of Rainfall Extremes Campaign in the Pacific)	Delayed	NSF		https://www.esd.ucar.edu/field_projects/precip	PRECIP seeks to improve our fundamental understanding and prediction of the processes that produce extreme precipitation through an ingredients-based physical framework. Research observations will be collected in four event types that meet a global definition of 'extreme' across a spectrum of rainfall intensity and duration: deep convective cores, wide convective cores, broad stratiform regions, and TCs. The field campaign is innovative in its approach to investigate the universal aspects of extreme rainfall by testing hypotheses that are not directed at only one weather phenomenon, and are therefore transferable to rainfall events that affect the United States. The experiment is designed to maximize the chances of observing a variety of heavy rainfall events in the moisture-rich natural laboratory of Taiwan and western North Pacific in order to find the commonalities. The primary objective is to simplify the complexity of multi-scale interactions by identifying key ingredients and processes in the limiting cases of high intensity and long duration events in a moisture-rich environment. Field measurements will be made to address basic research questions about key ingredients, physical processes, mesoscale structures, and prediction improvement. The core observations will consist of multi-frequency radars, radiosondes, disdrometers, and the Taiwan operational weather network that will be integrated with modeling and data analysis and assimilation to better understand the mechanisms that produce extreme rainfall.	Field campaign		Taiwan	2021							No
QuickSCAT	Completed	NASA		https://winds.jpl.nasa.gov/missions/quickcat/	QuickSCAT was a specialized microwave radar that measured near-surface wind speed and direction under all weather and cloud conditions over Earth's oceans.	Satellite		LEO Orbit, Global	1999	6	19	2018	9	NA		No
RELAMPAGO	Completed	NSF	DOE	http://projectorelampago.org/project-steering-committees/	The RELAMPAGO (Remote sensing of Electrification, Lightning, And Mesoscale/microscale Processes with Adaptive Ground Observations) field program will be conducted from 1 Nov - 15 Dec 2018 in west central Argentina in the general vicinity of the Sierras de Córdoba (SDC) and the Andes foothills near Mendoza. This region arguably has among the most intense convective systems in the world with respect to the frequency of large hail, high storm tops, and extreme lightning activity. RELAMPAGO aims to address science questions related to the pre-initiation to initiation, initial organization/severe-weather generation, and growth/backbuilding stages of storm development, which are poorly understood. New insights into connections between the extreme hydroclimate, high impact weather, and atmospheric dynamical processes in meteorological and geographical settings unique to these regions will be obtained through targeted multi-platform observations from the subsurface through the depth of the troposphere throughout the region. The project is led by NSF, including contributions from Argentina, Brazil, Chile, NOAA, and NASA, and will coordinate with the DOE CACTI campaign.	Field campaign		Northern Argentina	2018	11	NA	2018	12	NA		No
S-MODE (Sub-Mesoscale Ocean Dynamics Experiment)	In Progress	NASA		https://espo.nasa.gov/s-mode	S-MODE is a NASA Earth Venture Suborbital campaign that will test the hypothesis that submesoscale ocean dynamics make important contributions to vertical exchange of climate and biological variables in the upper ocean.	Field campaign	airborne campaign	Pacific Ocean near San Francisco	2019	6	1	2024	5	31	Tom Farrar (WHOI)	
SAGE-3 (Stratospheric Aerosol Gas Experiment III)	In Progress	NASA		https://fpd.larc.nasa.gov/sage-ii.html	Earth Venture Instrument Mission to the International Space Station to study ozone, a gas found in the upper atmosphere that acts as Earth's sunscreen.	Instrument on International Space Station (ISS)		Global	2017	2	NA	NA	NA	NA	Barry Lefer, Hank Margolis (NASA)	No
SAIL (Surface Atmosphere Integrated Field Laboratory)	Planned	DOE		https://www.arm.gov/research/campaigns/amf2021sail	The Surface Atmosphere Integrated Field Laboratory (SAIL) campaign will make measurements using the second ARM Mobile Facility (AMF2) and a scanning X-band dual polarimetric radar near Crested Butte, Colorado. The campaign will focus on the East River Watershed, which is a 300-km2 mountainous watershed that is part of the Upper Colorado River Basin. SAIL will advance understanding of mountainous water cycles by collocating ARM atmospheric observations with long-standing collaborative resources including the ongoing surface and subsurface hydrologic observations from the Department of Energy's Watershed Function Science Focus Area (SFA). The main science goal of the SAIL campaign is to develop a quantitative understanding of the atmosphere and land-atmosphere interaction processes, at their relevant scales, that impact mountain hydrology in the midlatitude continental interior of the United States.	Field campaign		Colorado	2021	9	15	2023	6	15		
SAMOC (South Atlantic Meridional Overturning Circulation)	Ongoing	NOAA		http://www.aoml.noaa.gov/phod/SAMOC_international/index.php		Observing network		South Atlantic	NA	NA	NA	NA	NA	NA		No
SGP (Space Geodesy Project)	Ongoing	NASA		https://space-geodesy.nasa.gov/	The global geodetic infrastructure is comprised of several networks and individual ground stations for: Very Long Baseline Interferometry (VLBI), Satellite Laser Ranging (SLR), Global Navigation Satellite Systems (GNSS), and Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS). NASA's Space Geodesy Program contributes to the global infrastructure through the deployment, operation, and maintenance of two coordinated networks: the NASA Space Geodesy Network (NSGN) of collocated VLBI, SLR, GNSS, and DORIS stations, and the NASA Global GNSS Network (GGN). The data produced by these networks is used for a variety of products, including: the definition of the International Terrestrial Reference Frame (ITRF), measurement of the Earth Orientation Parameters, and satellite precision orbit determination. The data and products from these networks are also used to support a broad range of scientific and societal applications in areas such as Earth observations, positioning, navigation, and timing.	Ground network		Global	2011			Ongoing	Ongoing	Ongoing	Stephen Merkowitz (GSFC)	
SMAP (Soil Moisture Active Passive)	Ongoing	NASA		http://smap.jpl.nasa.gov/	The Soil Moisture Active Passive (SMAP) mission is an orbiting observatory that measures the amount of water in the surface soil globally. SMAP is designed to measure soil moisture every 2-3 days.	Spaceborne		Global	2015	1	NA	Ongoing	NA	NA	Simon Yueh (JPL)	No
SNOWEx	Ongoing	NASA		https://snow.nasa.gov/campaigns/snowex	SnowEx will provide key insights into optimal strategies for mapping global SWE with remote sensing and models.	Field campaign		North America	2016			Ongoing	Ongoing	Ongoing	Jared Entin (NASA)	
SOCOM (Southern Ocean Carbon and Climate Observations and Modeling)	Ongoing	NASA	NSF (primary), NOAA	https://socom.princeton.edu/	The Southern Ocean Carbon and Climate Observations and Modeling project (SOCOM) is an NSF-sponsored program focused on unlocking the mysteries of the Southern Ocean and determining its influence on climate. SOCOM's mission is to drive a transformative shift in the scientific and public understanding of the role of the vast Southern Ocean in climate change and biogeochemistry.	Ground network		Southern Ocean	2014	9		Ongoing	Ongoing	Ongoing	Jorge Sarmiento (Princeton)	
SOCRATES (Southern Ocean Clouds, Radiation, and Aerosol Transport Experimental Study)	Completed	NSF	NOAA	https://www.esd.ucar.edu/field_projects/socrates	The remote and usually pristine environment, typically removed from anthropogenic and natural continental aerosol sources makes the SO unique for examining cloud-aerosol interactions for liquid and ice clouds, and the role of primary and secondary marine biogenic aerosols and sea-salt. Weather and climate models are challenged by uncertainties and biases in the simulation of SO clouds, aerosols, precipitation, and radiation which trace to poor physical understanding of these processes, and by cloud feedbacks (e.g., phase changes) in response to warming. NSF-funded airborne observations of cloud microphysics and radiation over the Southern Ocean, as well as some shipboard lower atmosphere measurements.	Field campaign		Southern Ocean	2018	1	NA	2018	2	NA		No
SODA (Stratified Ocean Dynamics in the Arctic)	Completed	ONR		http://www.apl.washington.edu/project/project.php?id=soda	Vertical and lateral water properties and density structure within the Arctic Ocean are intimately related to related to the ocean circulation, and have profound consequences for sea ice growth and retreat as well as for propagation of acoustic energy at all scales. The Stratified Ocean Dynamics of the Arctic (SODA) initiative focuses on understanding how the upper Beaufort sea responds to changes in inflow and surface forcing. Specific science questions address three oceanographic properties: buoyancy, momentum, and heat. The observational strategy includes: drifting observations from ice-based buoys and instruments drifting in the water column, geographically fixed sampling by moorings and gliders, Beaufort Sea inflow observations by floats and Pressure Inverted Echo Sounders (PIES), and a ship-based process study. These in situ observations will be augmented by remote sensing and numerical simulations to address the SODA science questions.	Field campaign		Arctic	2018	NA	NA	2020	NA	NA		No

Campaign/New Instrument Name [1]	Status	Primary Agency (Operating and/or Funding)	Partnering Agencies	URL	Description	Primary Observing Type	Secondary Observing Type	Study Area	Year Start	Month Start	Day Start	Year End	Month End	Day End	Contact	Long-Term Timeseries
SPICULE (Secondary Production of Ice in Cumulus Experiment)	Delayed	NSF		https://www.esl.ucar.edu/field_projects/spicule	This project will consist of two research aircraft making measurements of the same cloud at different heights to provide additional data on secondary ice production. The main societal impact of the award will be through the improvement of the representation of ice processes in numerical weather models, leading to better weather forecasts and climate projections. Student involvement will ensure the education and training of the next generation of scientists. The research team will conduct a summer 2020 field campaign in the western Great Plains to improve understanding of the processes involved in ice initiation and secondary ice production in cumulus clouds. The investigators argue that the well-known Hallet-Mossup process is not able to explain the observed rapid glaciation of cumulus clouds, and they offer the alternative hypothesis that the development of supercooled liquid droplets at the -5C level in strong cumulus updrafts leads to a spicule production/drop fracturing secondary ice production and rapid glaciation by the -20C level. The study is designed to provide improved quantitative measurements with dedicated flight profiles that will minimize ambiguity associated with primary nucleation and contamination from older clouds. The NSF/National Center for Atmospheric Research C-130 aircraft would target the below cloud region through the OC level and the SPEC Learjet would penetrate the cloud from the OC level and up in altitude. Important instruments include the Colorado State University suite of ice nuclei probes, the SPEC 3V-CPI and the University of Wyoming W-band cloud radar.	Airborne campaign		Colorado	2021							No
SPRUCE	Ongoing	DOE		http://mnspruce.csl.gov/	The Spruce and Peatland Responses Under Climatic and Environmental Change (SPRUCE) project is an experiment to assess the response of northern peatland ecosystems to increases in temperature and exposures to elevated atmospheric CO2 concentrations. The experimental work is to be conducted in a Picea mariana (Black spruce) – Sphagnum spp. bog forest in northern Minnesota, 40 km north of Grand Rapids, in the USDA Forest Service Marcell Experimental Forest (MEF). The site is located at the southern margin of the boreal peatland forest. It is an ecosystem considered especially vulnerable to climate change, and anticipated to be near its tipping point with respect to climate change. Responses to warming and interactions with increased atmospheric CO2 concentration are anticipated to have important feedbacks on the atmosphere and climate, because of the high carbon stocks harbored by such ecosystems. Experimental work will focus on the combined responses to multiple levels of warming at ambient or elevated CO2 (eCO2) levels. The experiment provides a platform for testing mechanisms controlling the vulnerability of organisms, biogeochemical processes and ecosystems to climate change (e.g., thresholds for organism decline or mortality, limitations to regeneration, biogeochemical limitations to productivity, the cycling and release of CO2 and CH4 to the atmosphere). Both direct and indirect effects of experimental perturbations will be analyzed to develop and refine models needed for full Earth system analyses.	Lab-based		Northern Minnesota	2015	NA	NA	Ongoing	Ongoing	Ongoing		No
SPURS-2 (Salinity Processes in the Upper Ocean Regional Study 2)	Completed	NASA	NOAA, NSF	http://spurs2.jpl.nasa.gov/	The overall goal of SPURS-2 is to improve the understanding of the physical processes that influence upper-ocean salinity and SSS in a precipitation-dominated regime with net freshwater and buoyancy fluxes into the ocean.	Field campaign		Tropical Pacific	2016	NA	NA	2017	NA	NA	Tom Farrar (WHOI)	No
	In Progress	NASA	NOAA, DOD	https://jointmission.gsfc.nasa.gov/	The NPOESS Preparatory Project (NPP) was renamed to Suomi National Polar-orbiting Partnership (Suomi NPP) in honor of Vernier E. Suomi, University of Wisconsin meteorologist, widely recognized as the "Father of Satellite Meteorology."	Spaceborne		Global	2011	10	1	NA	NA	NA		No
					Launched from California's Vandenberg Air Force Base a board a Delta-II Mission Launch Vehicle in October 2011, Suomi NPP is the predecessor to the JPSS series spacecraft and is considered the bridge between NOAA's legacy polar satellite fleet, NASA's Earth observing missions and the JPSS constellation. Suomi NPP was constructed with a design life of five years (although it's still functioning normally) and carries five state-of-the-art instruments: (1) VIIRS, (2) CrIS, (3) ATMS, (4) OMPs, and (5) CERES FMS.											
SWEX (Sundowner Winds Experiment)	Delayed	NSF		https://www.esl.ucar.edu/field_projects/swex	The main goal of this proposal is to improve the current understanding of the dynamics and predictability of downlope windstorms in coastal Santa Barbara County. The proposal brings together a research team with vast and diverse experiences in atmospheric sciences, regional modeling, and extensive experience in field campaigns. SWEX will be the first campaign in Southern California to investigate mechanisms driving downlope windstorms in the lee of a narrow mountain range in the subtropics that are influenced by complex interactions with a cool, stable, and shallow marine boundary layer with distinct spatial characteristics and dynamics.	Airborne campaign		California	2021							No
SWOT (Surface Water Ocean Topography) Mission	In Progress	NASA	CNES	http://swot.jpl.nasa.gov/	The SWOT mission brings together two communities focused on a better understanding of the world's oceans and its terrestrial surface waters. U.S. and French oceanographers and hydrologists and international partners have joined forces to develop this satellite mission to make the first global survey of Earth's surface water, observe the fine details of the ocean's surface topography, and measure how water bodies change over time.	Spaceborne		Global	2021	9	NA	NA	NA	NA	Lee-Lueng Fu (JPL)	No
TCCON (Total Carbon Column Observing Network)	Ongoing	NASA		https://tccon-wiki.caltech.edu/	The Total Carbon Column Observing Network (TCCON) is a network of ground-based Fourier Transform Spectrometers that record spectra of the sun in the near-infrared. From these spectra, accurate and precise column-averaged abundances of atmospheric constituents including CO2, CH4, N2O, HF, CO, H2O, and HDO, are retrieved.	Ground network		Global	2004	NA	NA	Ongoing	Ongoing	Ongoing		No
TCTE (TSI Calibration Transfer Experiment)	Completed	NASA	NOAA, US Air Force	https://jointmission.gsfc.nasa.gov/tcte.html	The Total Solar Irradiance Calibration Transfer Experiment (TCTE) operated from November 2013 until June 2019, and monitored incoming solar energy to help scientists understand the causes of climate change on our planet. The mission assisted in maintaining measurement continuity of the four-decade-long TSI climate data record following the loss of the NASA Glory mission in 2011.	Spaceborne		Global	2013	11	19	2019	7	1	Greg Kopp (LASP, CU)	No
TEMPO (Tropospheric Emissions: Monitoring of Pollution)	Planned	NASA		https://science.nasa.gov/missions/tempo	NASA's first Earth Venture Instrument mission will measure pollution of North America, from Mexico City to the Canadian oil sands, and from the Atlantic to the Pacific hourly and at high spatial resolution. TEMPO observations are from the geostationary vantage point, flying on a telecommunications host spacecraft with the goal to launch in 2022.	Spaceborne		North America, Atlantic, Pacific	2022	NA	NA	NA	NA	NA	Kelly Chance (Center for Astrophysics, Harvard & Smithsonian)	No
TES (Tropospheric Emission Spectrometer) on the Aura Satellite	Completed	NASA		https://tes.jpl.nasa.gov/	TES is a high-resolution infrared-imaging Fourier transform spectrometer offers a line-width-limited discrimination of essentially all radiatively active molecular species in the Earth's lower atmosphere.	Instrument on satellite		Global	2004	7	15	2018	1	31	Kevin Bowman (JPL)	
					TES has significantly more the spectral resolution of the AIRS instrument being flown aboard EOS Aqua. TES employs both the natural thermal emission of the surface and atmosphere and reflected sunlight, thereby providing day-night coverage anywhere on the globe.											
					TES operates in a combination of limb and nadir mode (called global survey mode) every other. On alternate days, TES does special observations including "step and stare" mode and assessment of special targets like volcanoes.											
Thwaites Glacier Program (Project name TBA)	In Progress	NSF		http://www.sciencemag.org/news/2016/10/us-and-uk-plan-thwaites-invasion-antarctica	The Thwaites Glacier (TG) research program will support an observational and modeling campaign in the TG and neighboring Amundsen Sea region to understand the changes taking place and the processes driving these changes. The program will have a direct and significant impact on understanding the stability of marine ice sheets and specifically the West Antarctic Ice Sheet in the vicinity of Thwaites Glacier, and will contribute to the ice-sheet modeling community capability to simulate ice sheets and to reduce the uncertainties in sea-level projections. In addition, the program will contribute to improving risk assessments that coastal communities need for decisions about adaptation and long-range planning.	Surface measurement network, field campaigns		Thwaites Glacier, Antarctica	2019	NA	NA	2021	NA	NA	See announcement at http://science.sciencemag.org/content/354/6308/23.full. Also see NSF call for proposals: https://www.nsf.gov/pubs/2017/nsf17505/nsf17505.htm	No
Thwaites Ice Sheet (Project name TBA)	In Progress	NSF		http://www.sciencemag.org/news/2016/10/us-and-uk-plan-thwaites-invasion-antarctica		Observing network, field campaigns		Thwaites Glacier, Antarctica	2019	NA	NA	2021	NA	NA		No
TI3GER (Technological Innovation Into Iodine and Gv-aircraft Environmental Research)	Planned	NSF		Coming soon	This field campaign includes test flights to certify instrumentation not previously flown on the NSF/NCAR Gulfstream V research aircraft. It also includes flights to address several scientific hypotheses, including the investigation of ozone loss in the upper troposphere and lower stratosphere (UTLS) due to iodine in the region. The research results from this novel collection of instrumentation flown in the UTLS is expected to significantly improve the scientific understanding of chemistry in the region. This project will test advanced instrumentation and a newly designed laminar flow inlet suitable for measuring condensable vapors and ambient ions on the GV research aircraft to achieve the following objectives: (1) The aircraft payload has been developed to experimentally constrain 90% of total iodine in the stratosphere by attempting the first simultaneous aircraft measurements of gas- and particle iodine; (2) Iodic acid (HIO3), a widespread condensable vapor that grows nanoparticles and drives changes in gas-particle partitioning of iodine, will be measured for the first time in the UTLS by aircraft; (3) Simultaneous measurements of ambient ions (number & chemical composition) will identify those condensable vapors that participate in ion-induced nucleation in the UTLS.	Airborne campaign		Colorado and Hawaii	2021							No

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TOLNet (NASA Tropospheric Ozone Lidar Intercomparison Project)	In Progress	NASA		https://www.air.larc.nasa.gov/missions/TOLNet/	Primary scientific objective is to provide time/height ozone measurements from near the surface to the top of the troposphere to describe in high-fidelity their spatio-temporal distribution	Ground network		CONUS	NA	NA	NA	NA	NA	NA		No
TOPDOWN (Twin Otter Projects Defining Oil Well and Natural gas emissions) 2015	Completed	NOAA	NASA	http://www.jpl.nasa.gov/news/news.php?feature=542		Field campaign		U.S. Four Corners Region	2014	4	17	NA	NA	NA		No
TPOS (Tropical Pacific Observing System) Sallidrone #1 Mission	Completed	NOAA		https://www.pmel.noaa.gov/news-story/two-sallidrones-headed-tropical-pacific-ocean-enhance-tropical-pacific-observing-system	Two saildrones launched from the Sallidrone Inc. dock in Alameda, CA to begin their six-month, 4,000+ nautical-mile, round-trip mission to the equator to improve the Tropical Pacific Observing System (TPOS). These saildrones are a component of a broader effort to rethink the Tropical Pacific Observing System (TPOS) that supports sub-seasonal to seasonal forecasting for the US. TPOS provides real-time data used by the US and partner nations to forecast weather and climate, including El Niño. The mission will be testing if this new, enhanced tool can collect a variety of measurements at a quality that matches research ships and proven mooring technology. Tropical Atmosphere Ocean (TAO) array. If this is the case, they may become a powerful tool to provide key observations for weather forecasts.	Field campaign		Tropical Pacific Ocean	2017	9	NA	2018	5	NA	Kathy Tedesco, NOAA	No
TRACER (Tracking Aerosol Convection Interactions Experiment)	Planned	DOE	NSF, NASA, TCEQ	https://www.am.gov/research/campaigns/amf2021tracer	During the Tracking Aerosol Convection Interactions Experiment (TRACER), scientists will use the first ARM Mobile Facility (AMF1), the second generation C-band ARM Scanning Precipitation Radar (CAPR2), and a small satellite site with radiosonde and aerosol measurements to learn more about cloud and aerosol interactions in the deep convection over the Houston area. The Houston region offers a unique environment where isolated convective systems are common and experience a spectrum of polluted aerosol conditions from urban and industrial areas. In addition, surrounding areas also show significantly lower background aerosol concentrations.	Field campaign		Texas	2021	4	15	2022	4	14		
TRACER-AQ (Tracking Aerosol Convection Experiment – Air Quality)	Planned	NASA	DOE, TCEQ	https://www.air.larc.nasa.gov/missions/tracer-aq/index.html	Air Quality and Health Study in Houston during Summer 2021 (August - September)	Field campaign	Field Campaign/Obse rving	Houston, Texas	2021	7	15	2021	9	15	Barry Lefer	No
TSIS-1 (Total Solar Irradiance Sensor)	In Progress	NASA		https://www.nasa.gov/goddard/tsis-1	The Sun is the predominant source of energy input to Earth. Solar radiation ensures the maintenance of the appropriate range of temperatures for the sustenance of life on Earth, by driving land surface heating, plant productivity, and oceanic and atmospheric circulations. Because of the Sun's dominant influence on Earth's function, it is important to accurately measure the solar input to Earth or solar irradiance. Measurement of the total solar irradiance (TSI) is essential for quantifying Earth's energy budget. NASA's Total and Spectral Solar Irradiance Sensor, or TSIS-1, is a mission to measure the Sun's energy input to Earth. Various satellites have captured a continuous record of this solar energy input since 1978. TSIS-1 sensors advance previous measurements, enabling scientists to study the Sun's natural influence on Earth's ozone layer, atmospheric circulation, clouds and ecosystems. These observations are essential for a scientific understanding of the effects of solar variability on the Earth system.	Instrument on International Space Station (ISS)		Sun	2018	3	NA	NA	NA	NA		No
UAVSAR (Uninhabited Aerial Vehicle Synthetic Aperture Radar)	Ongoing	NASA		https://uavsar.jpl.nasa.gov/	UAVSAR, a reconfigurable, polarimetric L-band synthetic aperture radar (SAR), is specifically designed to acquire airborne repeat track SAR data for differential interferometric measurements.	Instrument used on field campaigns			2018			Ongoing				No
Update of the PAMS Network Design and Functionality		EPA		https://www3.epa.gov/ttn/amtc/files/ambient/airtox/2015w orkshop/PAMS%20update.pdf		Observing network		Scattered throughout the United States	NA	NA	NA	NA	NA	NA		No
US GO-SHIP I07N expedition	Completed	NOAA	NSF, NASA	https://usgo ship.ucsf.edu/ ; https://i07n.wordpress.com/	GO-SHIP program carries out a systematic and global re-occupation of select hydrographic sections and provides approximately decadal resolution of the changes in inventories of heat, freshwater, carbon, oxygen, nutrients and transient tracers, covering the ocean basins from coast to coast and full depth (top to bottom). I07N was successfully conducted for the first time in 23 years.	Sustained effort		Indian Ocean	2018	4	NA	2018	6	NA	Kathy Tedesco, NOAA	No
US MBON (U.S. Marine Biodiversity Observing Network)	Ongoing	NOAA		http://www.marinebon.org/		Observing network		Chukchi Sea, Santa Barbara Channel, Florida Keys & Monterey Bay	TBD	TBD	TBD	NA	NA	NA		No
Utah Winter Fine Particulate Study	Completed	NOAA	EPA	http://www.esrl.noaa.gov/csd/groups/csd7/measurements/2017-uwfpa/	Twin otter flights with a chemically detailed payload are well suited to characterize the emissions, chemistry, transport patterns and spatial pollutant distributions associated with PM2.5 exceedances in the Wasatch region.	Field campaign		Wasatch Front	2017	1	NA	2017	2	NA		No
UV-B Monitoring and Research Program	Ongoing	USDA		http://uvb.nrel.colostate.edu/UVB/index.jsf	Measures UV-B in support of agricultural science to determine UV-B effects on crops, forests, plants, ecosystems, humans, animals, and aquatic systems.	Observing network		United States	NA	NA	NA	NA	NA	NA		No
VERTEX	Completed	NSF		https://www.esl.ucar.edu/field_projects/vertex	This was a study of downstream effects of a single wind turbine, based at the University of Delaware's experimental installation, with the goal of understanding whether wind turbine wakes promote or suppress vertical mixing in the lowest part of the atmosphere.	Field campaign		Lewes, Delaware	2016	NA	NA	2016	NA	NA		No
WCOA (West Coast Ocean Acidification) Survey 2016	Completed	NOAA		https://www.pmel.noaa.gov/co2/story/2016+West+Coast+Ocean+Acidification+Cruise	The cruise represents the most integrated West Coast Ocean Acidification (WCOA) cruise to date. WCOA2016 took place May 5 to June 7, 2016 aboard the NOAA Ship Ronald H. Brown. 132 stations were occupied from Baja California in Mexico to Vancouver Island in Canada along seventeen transect lines. At all stations, CTD casts were conducted, and discrete water samples were collected in Niskin bottles. The cruise was designed to obtain a synoptic snapshot of key carbon, physical, and biogeochemical parameters as they relate to ocean acidification (OA) in the coastal realm.	Field campaign/data collection cruise	Field campaign/labor atory	U.S. West Coast	2016	5	7	2016	6	7	Richard Feely, NOAA PMEL	No
WE-CAN	Completed	NSF		https://www.esl.ucar.edu/field_projects/we-can	Understanding the chemistry in western wildfire smoke has major ramifications for air quality, nutrient cycles, weather and climate. This project will systematically characterize the emissions and first day of evolution of western U.S. wildfire plumes. We focus on three sets of scientific questions related to fixed nitrogen, absorbing aerosols, cloud activation and chemistry in wildfire plumes. The data will be collected from the NCAR/NSF C-130 research aircraft.	Field campaign		western US	2018	NA	NA	2018	NA	NA		No
West Coast Atmospheric River Observatories (AROs)	Ongoing	NOAA		https://hmt.noaa.gov/news/2017/012717.html	The atmosphere above the Eastern Pacific Ocean, where many of the world's major weather and climate systems brew, is also one of the most poorly observed regions on Earth. In January, 2017, PSD engineers energized the final site (Pt. Sur, California) of seven semi-permanent, compact wind profilers, which create a "picket fence" of monitoring stations along the U.S. West Coast. The X-scale 449-MHz wind profilers are part of an unprecedented observing system to help address water resource and flood protection concerns. Each ARO has a 1/4-scale 449-MHz wind profiler, a Radio Acoustic Sounding System for temperature profiling, a GPS receiver and antenna for measurements of total precipitable water, and a 10-m meteorological tower.	Sampling site		Pt Sur, California	2017	1	NA	Ongoing	Ongoing	Ongoing		No
WFC (Wide Field Camera) on the CALIPSO Satellite	Ongoing	NASA	CNES	https://www.calipso.larc.nasa.gov/about/payload.php#CALIOP	The IR a nadir-viewing, non-scanning imager having a 64 km by 64 km swath with a pixel size of 1 km that is used to detect cirrus cloud emissivity and particle size.	Instrument on satellite		Global	2006			Ongoing	Ongoing	Ongoing	David M. Winker (LaRC)	
WFIP2 (Second Wind Forecast Improvement Project)	Completed	DOE	NOAA	http://www.esrl.noaa.gov/gsd/renewable/wfip2.html	The WFIP2 has maintained two overarching scientific goals: 1) To improve the physical understanding of atmospheric processes that directly affect wind energy forecasts in areas of complex terrain. 2) To incorporate the new understanding into a foundational weather forecasting model that improves wind energy forecasts.	Observing network/field campaign		Columbia River Gorge	2015	NA	NA	2019	NA	NA		No
Wind Forecast Improvement Project	Completed	NOAA	DOE	https://www.esrl.noaa.gov/gsd/renewable/energy/wfip2/	The second Wind Forecast Improvement Project (WFIP2) is a public-private partnership whose goal is to improve NWP model forecast skill for turbine-height winds in regions with complex terrain. A core element is an 18 month field deployment located in the Pacific Northwest, focusing on the Columbia River Gorge and Columbia Basin with instrument deployment occurring in the autumn of 2015. Obs will continue to be collected through March 2016 for a study of wind forecasts in the Pacific Northwest. The approach is to collect an extensive set of new meteorological observations (100 in situ and remote sensors), especially within the atmospheric boundary layer, use these to observe and understand relevant atmospheric processes, develop and test new model physical parameterization schemes, and ultimately transfer these improved models to NOAA/NWS operations, with additional applications to the fire-weather and aviation communities.	Field campaign		Pacific Northwest	2015	10	NA	2017	3	NA		No
WINTER	Completed	NSF		https://www.esl.ucar.edu/field_projects/winter	The study of: (1) how multiphase reactive nitrogen chemistry affects oxidant availability, ozone production, reactive halogen cycling and the export of pollutants during winter; (2) How differences in temperature, oxidants, biogenic emissions, and boundary layer dynamics between winter and summer impact secondary aerosol formation? and (3) How large are the changes in emissions from combustion and agricultural sources between winter and summer, and how do these differences affect distribution and processing of pollutants?	Airborne campaign		Mid-Atlantic U. S. coast	2015	January		2015	March			No